

Chapter 2 PROJECT DESCRIPTION

This chapter provides a description of the proposed project, the environmental effects of which are evaluated in Chapter 4 of this EIR. The project objectives and project location are described in this chapter, followed by a description of project characteristics and a summary of project approvals that would be required.

2.1 Project Objectives

The proposed project is the update of the Carlsbad Sewer Master Plan, and the Carlsbad Municipal Water District (CMWD) Water and Recycled Water Master Plans and to identify and implement the Capital Improvement Programs (CIP) required to meet current and future demand. The CMWD is a subsidiary district of the City of Carlsbad. The specific objectives of each plan are provided below.

2.1.1 Sewer Master Plan

The intent of the Sewer Master Plan is to plan sewer (wastewater) service for the Carlsbad sewer service area through buildout of the wastewater service area, which is anticipated to occur in 2035. The objectives of the plan are to:

- perform capacity analyses of the existing and future sewer collection system
- recommend a long-term CIP for improvement of existing wastewater collection and treatment facilities to meet future demand

2.1.2 Water Master Plan

The intent of the Water Master Plan is to plan water service for the CMWD through buildout of the service area, which is anticipated to occur in 2035. The CMWD proposes to implement the Water Master Plan to:

- address current water supply issues
- evaluate and meet future demands
- recommend CIP projects for continued reliable water service through service area buildout in accordance to the Carlsbad Growth Management Plan

2.1.3 Recycled Water Master Plan

The intent of Recycled Water Master Plan update is to guide the CMWD as it develops and expands the current recycled water distribution system to build out, which is anticipated to occur in 2035. CMWD wants to maximize the use of recycled water as this is currently the lowest cost water supply source. Specifically, CMWD proposes to implement the Recycled Water Master Plan to:

- maximize recycled water use in and around CMWD
- find cost effective system expansion opportunities
- optimize the existing and future system configuration
- identify CIP projects to meet future demand for recycled water

2.2 Project Location

The project area consists of the service areas of the CMWD for water and recycled water, and Carlsbad's wastewater (sewer) service area. The project area is generally located in the northern part of San Diego County within the city of Carlsbad, as shown in Figure 2-1. Carlsbad is bordered by the Pacific Ocean to the west, the Oceanside to the north, Vista and San Marcos to the east, and Encinitas to the south. The geography of Carlsbad is characterized by three lagoons along the coast and gently rolling to mesa-like hills. Elevations range from sea level along the coast to over 700 feet above sea level along the eastern boundary. The primary land use is residential, with local and regional commercial centers and several large industrial business parks. There is also a small public airport and visitor related facilities near the Legoland amusement park and the Four Seasons Resort. There is a large undeveloped area along the northeast boundary of Carlsbad that will remain as open space. The service areas of each agency are shown on Figure 2-2. Some CIP projects would extend into the areas of Oceanside, Vista, and San Marcos that are adjacent to Carlsbad to provide greater water supply reliability or extend recycled water service. The locations of the proposed CIP projects are shown on Figure 2-3.

2.3 Carlsbad Growth Management Plan

On July 1, 1986, the City of Carlsbad adopted a Growth Management Plan to help assure provision of adequate facilities for future development. Implementation of the Growth Management Plan was envisioned as a three level system, involving: 1) a Citywide Facilities and Improvement Plan, 2) the preparation of 25 Zone Facilities Plans, and 3) individual project approvals. The Citywide Plan established the following standards:

- **Sewer Collection System Performance Standard** – Trunk line capacity to meet demands as determined by the appropriate sewer district and must be provided concurrent with development.
- **Wastewater Treatment Capacity Performance Standard** – Sewer plant capacity is adequate for at least a five year period.
- **Water Distribution System Standard** – Line capacity to meet demand as determined by the appropriate water district must be provided concurrent with development. A minimum of 10-day average storage capacity must be provided prior to any development.

The City has maintained a Growth Management Plan and Growth Database since 1986 to monitor development within Carlsbad and to ensure that adequate facilities are constructed in an orderly manner to support future growth. The Growth Database includes information on existing and vacant parcels, including the existing and future land uses, current percent build-out, current population, future growth potential and anticipated timing of such growth. In addition, Carlsbad was divided into 25 separate planning areas, referred to as Local Facility Management Zones (LFMZs). Not all 25 LFMZs and their parcels are included in the wastewater service area or the CMWD service area. The sewer service area and the CMWD includes all or portions of LFMZs 1-10, LFMZs 13-22, LFMZ 24, and LFMZ 25. LFMZ 6 is partially served by Olivenhain Municipal Water District (OMWD), while LFMZs 11, 12, and 23 are entirely served by either Vallecitos Water District (VWD) or OMWD. The Sewer and Water Master Plans were developed in accordance with applicable Growth Management Plan standards.

2.4 Previous Master Plans

Master planning for sewer, water, and recycled water infrastructure has been conducted previously in the city. The current plans represent updates to previous master planning documents. Summaries of recent sewer, water, and recycled water master plans are provided below.

2.4.1 Previous Sewer Master Plans

The first Master Plan of Sewerage was prepared in 1987 and was the first plan prepared in accordance with the Carlsbad Growth Management Plan. In 1987, the majority of development in Carlsbad was along the coastal strip and was predominantly residential. The population of the 1987 study area was estimated at 39,000, and the ultimate population was projected to be 95,700. In 1987, the ultimate average flow from Carlsbad was projected to be 13.41 million gallons per day (mgd).

The Master Plan of Sewerage was subsequently updated in 1992. By 1992, the population of the study area had increased to 65,000 and the ultimate population projection had increased to 130,000. Development was starting to progress inland and the percentage of commercial/industrial development had increased since the last Master Plan. The projected population growth curve first developed in the 1987 Master Plan was revised to increase more rapidly through 2000, and then flatten out to an annual growth rate of approximately one percent from 2000 to buildout. In 1992, the ultimate average flow projection was increased slightly from the 1987 projection to an estimated flow of 13.84 mgd.

In 1994, the City of Carlsbad adopted a new General Plan. The 1997 Sewer Master Plan Update incorporated the revised 1994 land use and population projections from the new General Plan. The 1997 update addressed capacity analyses for various sewer trunk lines and the Encina Water Pollution Control Facility. The 1997 Sewer Master Plan Update was not formally adopted by the City of Carlsbad. The recommendations made in the 1997 Master Plan were incorporated into the 2003 Master Plan Update.

By 2002, wastewater flows had increased to approximately 6.8 mgd with the development of several large planned developments. Several other large planned developments were in detailed planning stages. The City of Carlsbad had developed a new planning tool, a Growth Database, which projected the number of future residential units and the size of non-residential buildings for each parcel at buildout. The 2003 Sewer Master Plan Update utilized this data together with updated unit flow factors to project ultimate flows and identify facilities required for buildout of the Carlsbad sewer service area, which was projected to occur by 2020. Ultimate flows were projected to be 9.9 mgd, approximately 40 percent lower than the 1992 Sewer Master Plan projections. A major task included in the scope of

the 2003 Sewer Master Plan was development of a Geographic Information System (GIS) for the sewer collection system and an integrated computer model of the major interceptors. The interceptors were analyzed with the city flows and then evaluated with respect to the pipeline capacity of City capacity rights in jointly-owned pipelines.

2.4.2 Previous Water Master Plans

The original Water Master Plan was approved in 1990. A subsequent update, prepared in 1997, revised and updated population projections, planning criteria, and development plans. The 1997 Master Plan Update identified the facilities required to serve existing and projected potable water demands within the service area and adjacent areas of influence. The 1997 document was not formally adopted by the CMWD and, as such, the recommendations made in the 1997 Update were incorporated into the 2003 Water Master Plan Update.

The 2003 Water Master Plan Update evaluated the CMWD water distribution system and its ability to meet project demands. Since the Master Plan Update in 1997, a substantial number of residential, commercial, and industrial developments had been constructed and future development had been identified in the 2001 Growth Management Database. The 2003 document presented an update of CMWD's Water Master Plan for the planning period between 2001 and buildout of the CMWD's service area, which was anticipated to occur by 2020. CMWD reviewed all infrastructures within the service area to identify necessary improvements to existing facilities, capacity improvements, and expansion needs.

2.4.3 Previous Recycled Water Master Plans

The CMWD started its recycled water program in 1990 with the preparation of its first Recycled Water Master Plan. Subsequently, in May 1990, CMWD adopted an ordinance mandating the use of reclaimed water. In March 1992, the Board adopted the City of Carlsbad Water Reclamation (Recycled Water) Master Plan and started implementing the recycled water system facilities of Phase I. With recycled water purchased from neighboring VWD and Leucadia Wastewater District, CMWD served over 1,000 acre feet per year (afy), or 0.89 mgd, of recycled water by 1995. With Phase I complete, CMWD hired Carollo Engineers in 1997 to update its Recycled Water Master Plan and prepare a plan for the Phase II expansion. Phase II included construction of the 4 mgd (4,480 afy) Carlsbad Water Recycling Facility (CWRF), expansion of the Meadowlark Water Reclamation Facility (MWRF) from 2.25 mgd (2,520 afy) to 5 mgd (5,600 afy), reliability and control improvements to Mahr Reservoir, three new booster pump stations, and 24 miles of additional recycled water pipeline. Construction of Phase II was initiated in 2004, and went into full operation in January 2008. Currently, CMWD is still connecting Phase II customers to the distribution system and the Phase II system demand is anticipated to increase to approximately 5,000 afy (4.5 mgd) once all Phase II customers are connected.

2.5 Project Characteristics

The components of each of the three proposed Master Plan updates are described below.

2.5.1 Sewer Master Plan

2.5.1.1 Purpose

The Sewer Master Plan update represents an update of the Carlsbad Sewer Master Plan for the planning period between 2009 and buildout of the Carlsbad service area, which is projected to occur by 2035. The update includes documenting existing facilities, conducting wet weather monitoring, performing an Infiltration and Inflow analysis, updating unit sewer flows, projecting ultimate wastewater flows, and developing a computer model of the entire collection system to perform capacity analyses of the existing and ultimate collection systems. An additional 4,333 residences, 3,717,662 square feet of commercial development, and 6,102,099 square feet of industrial development are anticipated to be developed in the sewer service area at buildout compared to existing conditions. Most development would occur as part of planned developments in the eastern portion of Carlsbad. Future wastewater flows are projected to increase by approximately 2.1 mgd (or 27 percent) at buildout for a total ultimate average dry weather wastewater flow of 10 mgd.

2.5.1.2 Capital Improvement Program Overview

The proposed CIP projects for the sewer system include rehabilitation of existing facilities, upgrading existing facilities to accommodate higher capacities, providing new sewer collection infrastructure, increasing interceptor capacity, and implementing improvements to the Encina Water Pollution Control Facility. The sewer CIP projects are summarized in Table 2-1.

In addition to the Gateshead lift station removal and Simsbury lift station removal CIP projects listed above (SR-6 and SR-11), the Sewer Master Plan proposes the removal of two other lift stations and replacement with gravity sewer pipelines. Wastewater flows would be added to existing or future sewer pipeline constructed in future streets. The lift stations that are planned to be eliminated, and a description of their replacement pipelines, are listed in Table 2-2.

Lift Station Improvements

In addition to the lift station improvements included as individual projects in the CIP, the Master Plan proposes minor improvements to existing lift stations, included together as CIP project SR-8. A summary of the proposed lift station projects is shown in Table 2-3. The Simsbury and Vancouver lift stations are proposed to be demolished, as described above in the discussion of lift station replacement. However, Simsbury lift station replacement is not anticipated to occur for at least five years; therefore, interim improvements are proposed.

2.5.1.3 Sewer Master Plan Phasing

The Sewer Master Plan would be implemented to meet buildout of the Carlsbad service area in 2035. The order of CIP project implementation would be adjusted each year and projects would be prioritized based on need, availability of staff, and funding.

Table 2-1 Proposed Sewer CIP Projects

Project ID	Location	Description	Projected Start Date
Sewer Pipeline Rehabilitation Projects			
SR-1	5514 Leucadia Trunk Sewer Rehabilitation Project	Line 670 LF of an existing 21 inch pipe with cured-in-place pipe. The Leucadia Wastewater District would be the lead agency and the City would pay its share based on flow in the pipe.	Unknown
SR-2	5517 North Batiquitos Lift Station	All three existing pumps (2 operating and 1 standby pump) would be replaced because the existing pumps are reaching the end of their useful life. Some minor manifold pipe modifications are proposed for meter installation. Each pump currently includes a 100 hp motor with a capacity of 1210 gpm for each pump. No capacity increase is proposed.	2013
SR-3	5501 Buena Interceptor Sewer	Rehabilitate 65 manholes.	2013
SR-4	5513 Condition Assessment of Sewer Pipelines	Assess condition of pipelines greater than 12 inches in diameter.	On-going
SR-5	5519 Flow Meter Replacement	Flow meter replacement in existing sewer lift stations.	2012
SR-6	Gateshead Sewer Lift Station Removal	Remove the existing lift station, which would include removal of two 3 hp pumps, manifold piping, and all electrical/mechanical equipment. A concrete wetwell would also be removed within 5 feet of the ground surface. Removal of the lift station would require the installation of a 10 inch diameter gravity flow pipeline within a new street concurrently with development of the adjacent downhill property (Robertson Ranch West).	Unknown
SR-7	5520 Odor and Corrosion Prevention Assessment	Odor and corrosion prevention assessment at various locations in city sewer system.	On-going
SR-8	3840 Sewer Lift Station Repairs and Upgrades	Miscellaneous improvements to existing lift stations including replacement or corrections for safety, odor control, and noise attenuation.	On-going
SR-9	3927 & 5503 Sewer Pipeline and Manhole Refurbishments and Replacements	Refurbish/replace sewer line and manholes because of severe corrosion or to repair failed structural sections of a pipe or manhole. Options include installing a liner on the inside of structure, referred to as cured in-place pipe, or replacement with a new pipe or manhole.	On-going
SR-10	5502 Terramar Lift Station and Forcemain Replacement	Replace an existing lift station with a new wetwell in a parkway area and replace the two 3 hp, 100 gpm pumps along with new motor control center panel and switchgear. Install 553 LF of 8 inch diameter forcemain in Cannon Road.	2012
SR-11	Simsbury Sewer Lift Station Removal	Remove lift station after pipeline CIP N-9 is installed, including removal of two 50 hp pumps and the wetwell structure within 10 feet of the ground surface.	2014
SR-12	5523 Summerwind Place	Relocate 3,060 LF of 8 inch diameter pipeline within an open space lot adjacent to Agua Hedionda Lagoon. Project provides access to the sewer pipeline.	2013
SR-13	5524 Tamarack Sewer Relocation	Relocate 200 LF of 10 inch diameter pipeline at railroad right-of-way.	2012
SR-14	5515 Vancouver Street HDD Sewer Pipeline	Install 1,310 LF of 8 inch diameter, 1,700 LF of 10 inch diameter, and 1,500 LF of 12 inch diameter pipeline across a city park and open space lot. The open space lot would be constructed using tunneling to avoid habitat disturbance.	2012

Table 2-1 Proposed Sewer CIP Projects (continued)

Project ID	Location	Description	Projected Start Date
SR-15	Foxes Landing Lift Station Wetwell and Pump Replacement	Replace the wetwell and three existing 38.7 hp pumps. Pumps would be replaced with same capacity pumps, but the entire below ground concrete structure would be modified to convert it to a submersible pump station configuration. The pump controls/switchgear will be replaced and include odor control improvements.	2014
SR-16	Foxes Landing Lift Station Forcemain Rehabilitation	Rehabilitate existing forcemain with 920 LF of 12 inch diameter cured-in-place pipeline.	2014
SR-17	Vista/Carlsbad Interceptor Sewer Reaches 1&2 Rehabilitation	Rehabilitate existing pipeline using a cured-in-place pipe liner.	2013
SR-18	Terramar Collector Sewer Replacement (El Abrol Drive and Los Robles Drive)	Replace 5,395 LF of 8 inch diameter pipeline within public streets.	2013
SR-19	North Batiquitos Sewer Access Road Improvements	Road improvements include working with the California Department of Fish & Game and Batiquitos Lagoon Foundation to construct a decomposed granite or gravel access road in an undeveloped area to accommodate sewer maintenance vehicle and provide a public trail.	2013
SR-20	North Batiquitos Lift Station Forcemain Rehabilitation	Rehabilitate original forcemain by installing 1,826 LF of 14 inch diameter cured-in-place pipeline.	2015
SR-21	Crest Drive Sewer Extension	Eliminate existing septic system by extending 570 LF of 8 inch diameter sewer pipeline in a street to existing homes to provide public sewer service.	2015
SR-22	Sewer Easement Access Road	Develop program to install and obtain permits to construct 12-foot wide decomposed granite or gravel roads used to provide access to existing manholes for routine sewer pipe cleaning and pipeline/manhole assessment work.	On-going
SR-23	Buena Interceptor Sewer Access Road Improvement (East of Costco)	An existing pipeline is located adjacent to Encinas Creek and vegetation encumbers access to manholes. The project would provide access to the manholes through access road construction or possibly sewer pipeline relocation or realignment. The decomposed granite or gravel access road is anticipated to be 12 feet wide.	2013
SR-24	Buena Interceptor Sewer Realignment (East End)	Realign 2,710 LF of 18 inch diameter pipeline to relocate pipeline out of low lying creek beds and into streets or paved parking areas.	2013
SR-25	5509 Home Plant Sewer Lift Station and Forcemain Replacement	Replace an existing lift station with new a concrete wetwell and install three new submersible 25 hp (800 gpm) pumps to replace the existing three pumps. The project would convert the existing lift station structure to emergency overflow storage, install new motor control center and switchgear inside masonry building, provide an odor control bed system and standby power generator, and install 2,308 LF of an 8 inch diameter forcemain.	2012
Sewer Collection System Capacity Projects			
C-1	Poinsettia Lane Sewer Replacement	Upsize 53 LF of 8 inch diameter pipeline to convey wet weather flows.	2015
C-2	Marron Road Sewer Replacement	Upsize 276 LF of 8 inch diameter pipeline to convey wet weather flows.	2015
C-3	Las Palmas Trunk Sewer	Install 3,901 LF of 15 inch diameter pipeline.	2015

Table 2-1 Proposed Sewer CIP Projects (continued)

Project ID	Location	Description	Projected Start Date
C-4	Faraday and El Camino Real (Orion to PAR) Sewer Pipeline Replacement	Replace 3,323 LF of 12 inch diameter pipeline	2013
C-5	5504 Sewer Monitoring Program	Perform sewer flow measurements to verify capacity of pipelines to convey wastewater. Performed throughout the system.	Ongoing
Sewer Collection Pipeline Projects			Unknown
N-1	Holly Springs Property	Install 1,809 LF of 8 inch diameter pipeline in future public street.	Unknown
N-2	Cantarini Property	Install 5,180 LF of 8 inch diameter and 10 inch diameter sewer pipelines in future public streets.	Unknown
N-3	Mandana Property	Install 6823 LF of 8 inch diameter and 10 inch diameter pipeline in future public street with a potential for easement at creek crossing.	Unknown
N-4	Las Flores Sewer Extension	Install 1,087 LF of 8 inch diameter pipeline in a graded easement parallel to the Interstate 5 freeway and a street where it proceeds east from the freeway.	Unknown
N-5	Robertson Ranch East	Install 17,019 LF of 8 inch diameter and 10 inch diameter pipeline in future public street.	Unknown
N-6	Terramar Sewer Extension	Install 1,207 LF of 10 inch diameter pipeline in future street or Carlsbad Boulevard.	Unknown
N-7	Dos Colinas	Install 3,390 LF of 8 inch diameter pipeline in future public streets.	Unknown
N-8	Robertson Ranch West	Install 17,995 LF of 8 inch diameter and 10 inch diameter pipeline in future public street and El Camino Real.	Unknown
N-9	Quarry Creek (Simsbury) Sewer Extension	Install 6,030 LF of 10 inch diameter pipeline in an open space easement from Simsbury Court to a future public street and between Haymar Drive and a future public street on north terminus.	Unknown
N-10	Ponto Sewer Extension	Install 2,872 LF of 10 inch diameter and 12 inch diameter sewer in future public streets. A jack and bore casing construction method would be used to cross the NCTD right-of-way.	Unknown
N-11	College Avenue Trunk Sewer	Install 2,882 LF of 10 inch diameter pipeline in future College Boulevard.	Unknown
N-12	Palomar Commons/ Buena Sewer Realignment	Install 857 LF of 8 inch diameter pipeline in future public streets.	Unknown
Interceptor Capacity Projects			
I-1	3650 Vista/Carlsbad Interceptor (VC-3)	Replace 3,483 LF of 42 inch diameter pipeline across a parking lot and install 200 LF of pipeline using a jack and bore casing construction method to cross under Buena Creek.	2016
I-2	Vista/Carlsbad Interceptor - Buena Vista Lift Station Improvements	Install an additional 300 hp pump and make manifold piping modifications at lift station.	2014
I-3	3886 Vista/Carlsbad Interceptor Reach (VC-11B)	Install 1,400 LF of 54 inch diameter pipeline and remove the existing wood trussel supporting the sewer pipeline. Install a new 250 foot "clearspan" steel truss bridge crossing Agua Hedionda Lagoon to support the new 54 inch diameter interceptor pipe.	2014

Table 2-1 Proposed Sewer CIP Projects (continued)

Project ID	Location	Description	Projected Start Date
I-4	3492 Vista/Carlsbad Interceptor - Agua Hedionda Lift Station and Force Main (VC-12 and VC-13)	Upgrade the existing lift station by replacing the four existing 8,000 gpm, 100 hp pumps (2 operating and 2 standby) rated at 16,000 gpm total with a new eight pumps set capable of peak wet weather flow of 32 mgd (22,000 gpm). Four pumps would be 15 hp and four pumps would be 100 hp. Pumps would be installed on the south side of a new bridge in a new concrete wet pit/dry pit structure with manifold piping and a standby power generator. Install 3,492 LF of 30 inch diameter force main.	2014
I-5	3949 Vista/Carlsbad Interceptor Reach (VC-14 and VC-15) Parallel Pipeline	Install 7,122 LF of 54 inch diameter pipeline in Avenida Encinas.	2014
I-6	5508 Vista/Carlsbad Interceptor-Buena Vista Lift Station Forcemain (VC-4)	Install 3,700 LF of 21 inch diameter force main and slipline an existing forcemain with HDPE liner.	2012
Encina Water Pollution Control Facility (EWPCF) Projects			
E-1	EWPCF	Capital acquisitions/replacement/rehabilitation for the City's share of the annual budget established for ongoing replacement of equipment and making existing site improvements as part of annual condition assessment program.	On-going
E-2	EWPCF	Continue annual payment for bond financing of the Phase IV expansion, which has already been construction and will be fully paid for in fiscal year 2014-2015.	On-going

LF = linear feet, hp = horsepower, gpm = gallons per minute

Source: CMWD 2012

Table 2-2 Proposed Sewer Lift Station Replacement CIP Projects

Existing Lift Station to be Eliminated	Proposed Improvement	Projected Start Date
Vancouver Lift Station Abandonment	After a gravity pipeline is constructed to convey flows west to the Vista/Carlsbad Interceptor (see CIP SR-14), the existing lift station would be removed, including all equipment and electrical systems.	Unknown
Simsbury Lift Station Abandonment	After a gravity flow pipeline is constructed to the north (see CIP N-9), the existing lift station would be removed including all equipment and electrical systems.	Unknown

Source: CMWD 2012

Table 2-3 Proposed Sewer Lift Station Improvements

Lift Station	Proposed Improvement			
	Gas Detectors	Ventilation Modifications	Wiring Repairs	Float Switch Modifications
Chinquapin	X	X		X
Simsbury	X	X	X	X
Villas	X	X	X	X

Source: CMWD 2012

2.5.2 Water Master Plan

2.5.2.1 Purpose

This Water Master Plan Update develops a plan to address current issues and conditions that affect the water system through a water supply assessment, demand analyses, and hydraulic modeling. The Water Master Plan provides an update to the 2003 Water Master Plan, including a capacity evaluation to meet future demands and recommended CIP projects for continued reliable water service through buildout in accordance to the Carlsbad Growth Management Plan.

The Growth Database, last updated in February 2010, includes information on current and proposed development plans, including the number of projected residential dwelling units and the estimated building square footage for non-residential land uses, as well as an estimated timing for when each unit will be constructed. Based on the growth database, CMWD is anticipating an additional 4,267 residential units (1,562 single family and 2,706 multi-family) and approximately 8.8 million square feet of non-residential building space by 2035. This represents a nearly 12 percent increase in residential units and a nearly 55 percent increase in non-residential square footage. The total buildout projections for the CMWD service area include 40,068 residential units and nearly 25 million square feet of non-residential building space. A majority of the planned growth is projected to continue to occur in the eastern portion of the city. Although the construction of residential and commercial development is estimated to be built out by 2035, population is anticipated to continue to increase through 2050, as forecasted by the San Diego Association of Governments. Potable water demand is anticipated to increase eight percent from 19.1 mgd in 2007 to 20.8 mgd in 2035. Between 2035 and 2050, water demand is projected to increase three percent, to 21.4 mgd.

2.5.2.2 Capital Improvement Program Overview

The CIP projects identify the facilities needed to meet existing system needs based on CMWD design criteria as well as accommodate future growth and development. Proposed CIP projects recommended for the CMWD water system are shown on Figure 2-3 and described below. The projects that would occur in each phase are identified in Tables 2-4 through 2-6, and Tables 2-8 through 2-10.

Water Supply and Transmission

The water supply and transmission CIP projects implement opportunities to expand or diversify the CMWD water supply. For example, if water is produced by a proposed 50 mgd seawater desalination project to be located adjacent to the Encina Power Plant in Carlsbad, by Poseidon Resources, then the SDCWA may purchase this water through a future agreement with Poseidon Resources. The timing and implementation of this project is uncertain but could begin in 2012. It is possible that in the future the CMWD could request and benefit from a new connection to a SDCWA desalinated seawater conveyance pipeline. Additionally, the CMWD currently does not use groundwater as a source of potable water, but the CMWD does have access to groundwater in the vicinity of Rancho Carlsbad Golf Course and the Mission Groundwater basin along the San Luis Rey River.

The existing water supply is imported water obtained through SDCWA aqueducts. The CMWD purchases treated imported water at four connections to the aqueduct. The first is Connection No. 1 located at the intersection of Rancho Santa Fe Road and San Marcos Boulevard. The second is Connection No. 2 located at Alga Road near El Furete Street. Connection No. 3 and No. 4 is from the Tri Agencies Pipeline

(TAP) where CMWD obtains capacity through a three-party agreement with Oceanside and the Vista Irrigation District (VID) for conveyance capacity in the TAP transmission main which is owned by SDCWA. The TAP pipeline is a critical supply facility and loss of this pipeline upstream would impact water supply to Maerle Reservoir and the Calavera Hills area. The most critical reach for the CMWD is upstream of Connection No. 3. The CMWD has conducted a preliminary assessment of the TAP pipeline and found that the portion downstream of Connection No. 3 to Connection No. 4 is in very poor condition and in need of rehabilitation or replacement. The only alternative to replacing this portion of the TAP pipeline would be to abandon this segment and convert its Calavera Hills pump station from a redundant/back-up pump station to a permanent, closed-system pump station that would operate continuously. For the purposes of the Master Plan, it was assumed that the CMWD will budget the replacement of the TAP pipeline segment west of Connection No. 4. If the CMWD decided to implement the Calavera Hills pump station alternative, additional analysis would be required. The proposed water supply and transmission projects to obtain water from SDCWA are listed in Table 2-4.

Table 2-4 Proposed SDCWA Water Supply and Transmission CIP Projects

CMWD ID No.	Description/Location	Phase	Projected Start Date
48	Replace or rehab TAP between SDCWA #3 and Maerle Reservoir, and SDCWA #4 and 580 Zone at College Boulevard.	II, III	2014
49	Install SDCWA #5 connection and 1,100 LF of 30 inch diameter pipeline in Business Park Drive for direct delivery of desalinated seawater.	IV	2017

LF = linear feet

Source: CMWD 2012

Water Transmission Pipeline Projects

Most of the pipeline projects identified in the CIP were previously proposed in the 2003 Master Plan. Eleven of the projects are to improve fire flows, and the remaining new pipeline projects are transmission mains to supply new development areas and improve reliability, or projects to provide a redundant supply to existing development. In addition, CMWD staff have identified numerous pipelines that require relocation due to their location in old easements or on private property. The CIP water transmission pipeline CIP projects are listed in Table 2-5.

Water Storage Facility Projects

The focus for the CMWD over the next 5 to 10 years is the rehabilitation of older water tanks. The highest priority for the CMWD is to rehabilitate the older steel tanks, as several are now in need of re-coating and painting. The concrete tanks require much less rehabilitation. Another high priority for the CMWD is to replace the Maerle Reservoir floating cover, which was installed in 1995 and will be reaching its life expectancy with the expiration of its 20-year warranty in 2015.

The CMWD proposes major steel tank rehabilitation projects as part of its Phase II 2011-2015 CIP, which would include design and construction. The highest priority projects are Elm and Skyline, which have coating systems that are estimated to have about one year of useful remaining life. La Costa Lo has about three years of remaining useful coating life, and additional repairs are required at the Ellery and D3 tanks. A CIP project is included to decommission the "E" Tank, which has not been active in the water distribution system due to hydraulic constraints for the past year and has recently been permanently isolated from the potable system. The "E" Tank may become a potential recycled water tank in the future. The Buena Vista forebay tank that serves the emergency back-up pump station is

also recommended to be abandoned, and this work is included as part of the Buena Vista pump station decommission project (CIP PS3), listed in Table 2-8 below.

CIP Project R2 consists of repairs replacements at several storage tanks. These repairs and replacements are listed in Table 2-7.

Water Pump Station Projects

Four out of the proposed five water pump stations maintained by the CMWD are back-up pump stations to convey water from lower to higher pressure zones in the event of a local system outage, or a major loss of supply from SDCWA. Only the Maerkle pump station supplies water on a regular basis to transfer water from the bottom of Maerkle Dam reservoir to the regulating Maerkle tank. While the Maerkle pump station can supply the existing average day demand for the entire distribution system, capacity upgrades will be required in the future to maintain or improve upon this level of service.

Each emergency or back-up pump station was reviewed to determine its function and potential need and benefit to the CMWD in both the near and long term, to develop recommendations for upgrades, or abandonment. After discussions with City Utilities Department staff, it was concluded that the Buena Vista pump station and the Ellery pump station were no longer needed. Projects to decommission both pump stations are included in the CIP. The pump station CIP projects are listed in Table 2-8.

Groundwater Projects

CMWD currently does not use any local groundwater or surface water supplies. The Batiquitos Lagoon Valley Groundwater Basin is the only basin located in CMWD's service area; however, the CMWD also has rights to water from the Mission Basin of San Luis Rey Valley River groundwater, located north of CMWD, and the San Marcos Valley Groundwater Basin, located east of CMWD. Other groundwater basins that could be potential sources of groundwater include Buena Vista Creek Basin, Agua Hedionda Creek Basin, Encinas Creek Basin, and the Batiquitos Hydrologic Subarea. Of the groundwater basins available to CMWD, the Mission Basin of the San Luis Rey River has the most potential to be a viable water resource. A groundwater supply from the Mission Basin would require the construction of several wells, a groundwater treatment facility, and a conveyance system. For the long range CIP, Phase IV is proposed to include the planning, design, and potential implementation of a small well water supply and treatment project. Details of the project, including selection of the most advantageous groundwater basin for development, would be determined during project planning. The proposed groundwater CIP projects are listed in Table 2-9.

Miscellaneous Water CIP Projects

The Water Master Plan CIP also includes CIP projects to repair or install pressure regulating stations, improve connections to neighboring water agencies, generate hydroelectricity, reduce corrosion, and repair broken valves. These projects are listed in Table 2-10.

Table 2-5 Proposed Water Transmission Pipeline CIP Projects

CMWD ID No.	Zone	Description/Location	Phase	Projected Start Date
F1	330	Replace 600 LF of 6 inch diameter and 4 inch diameter pipeline in Jeanne Place to end of cul-de-sac with 8 inch diameter pipeline.	III, IV	2014
F2	446	Replace 650 LF of 6 inch diameter pipeline in Nob Hill Drive to end of cul-de-sac with 8 inch diameter pipeline.	III, IV	2014
F3	446	Replace 890 LF of 6 inch diameter pipeline in Holly Brae Lane and Alder Avenue east of Skyline Drive with 8 inch diameter pipeline.	III, IV	2014
F5	255	Replace 710 LF of 6 inch diameter pipeline in Cynthia Lane and in Gregory Drive from Knowles Avenue to cul-de-sac with 8 inch diameter pipeline.	III, IV	2014
F6	330	Replace 1,250 LF of 6 inch diameter pipeline in Tamarack Avenue from Highland Drive west to Adair Street and in Adair Street to cul-de-sac with 8 inch diameter pipeline.	III, IV	2014
F7	330	Replace 700 LF of 6 inch diameter pipeline in Highland Drive from Yourell Avenue to Ratcliff Road with 8 inch diameter pipeline.	III, IV	2017
F8	580	Provide a new fire hydrant connection to switch supply for the Calavera Recreation Center hydrants from the 580 Zone to the 446 Zone to obtain storage for increased reliability.	III, IV	2017
F9	330	Replace 560 LF of 6 inch diameter pipeline in Chestnut Avenue at Woodland Way to the end of Woodland Way with 8 inch diameter pipeline.	III, IV	2017
F10	241	Replace 850 LF of 6 inch diameter pipeline in Garfield Street from Chiquapin Avenue to end with 8 inch diameter pipeline.	III, IV	2017
F11	330	Replace 780 LF of 6 inch diameter pipeline in Arland Road from Highland Drive to Buena Vista Way with 8 inch diameter pipeline.	III, IV	2017
F12	330	Install 3,000 LF of 8 inch parallel pipeline in Highland Drive from Hillside Drive south to Adams Street for fire flow and redundancy.	III, IV	Unknown
F15	255	Replace 500 LF of 4 inch diameter pipeline in Palm Avenue from Harding Street to Pio Pico Drive. Install pipeline using jack and bore method to cross Interstate 5.	III, IV	Unknown
2	241	Parallel 600 LF of existing 8 inch diameter pipeline in Crestview Drive south of El Camino Real for redundancy.	I	2013
7	490	Install 4,000 LF of 16 inch diameter pipeline in College Boulevard from intersection with Cannon Road, south to 400 feet north of El Camino Real.	IV	Unknown
8	375	Install 4,130 LF of 12 inch diameter pipeline in future College Boulevard, from Cannon Road south to Badger Lane.	IV	Unknown
10	490	Install 8,900 LF of 36 inch diameter pipeline in easement across habitat management plan preserve from Maerkle Reservoir to College Boulevard for supply/redundancy.	II	2014
17	375	Install 2,700 LF of 12 inch diameter pipeline in Poinsettia Lane from Skimmer Court to Cassia Road for looping and D3 Reservoir supply.	III	Unknown
19	550	Install 3,100 LF of 8 inch diameter pipeline in Aviara Parkway at Plum Tree north to Mariposa Street, then east to Sapphire Drive for redundancy.	III	2013
21	700	Install a new pressure regulating station at El Fuerte Street/Corintia Street and 1,000 LF of 12 inch diameter pipeline in El Fuerte Street north of Corintia Street for redundant supply to Zones 680, 580S and 510.	III	2014
22	318	Install 4,900 LF of 12 inch diameter pipeline in Carlsbad Boulevard from Avenida Encinas south to CMWD boundary for redundancy and San Dieguito Water District interconnection.	IV	2015
25	375	Install 1,300 LF of 12 inch diameter pipeline in Poinsettia Lane from El Camino Real to Skimmer Court for supply/redundancy.	III	2022

Table 2-5 Proposed Water Transmission Pipeline CIP Projects (continued)

CMWD ID No.	Zone	Description/Location	Phase	Projected Start Date
40	446	Install a 4,700 LF of 16 inch diameter main through Robertson Ranch to replace the "B" line.	III, IV	Unknown
43	241	Replace 500 LF of failed pipeline and repair roadway and sidewalk of Park Drive from Adams to 200 feet south of Cove Drive.	I, II	2013
47	700	Install 3,300 LF of new 30 inch diameter inlet pipeline to Santa Fe II Tank.	II	2015
50	--	Install 3,200 LF of new 20 inch diameter inlet pipeline to La Costa Hi Tank from SDCWA #2 to create separate tank inlet/outlet.	IV	2015
54	--	Remove/replace approximately 1,500 LF of pipeline in easements and relocate meters in multiple locations. The total length of replacement pipe will depend on final alignment design to provide service to individual residences.	IV	On-going
55	330	Install 4,400 LF of 12 inch diameter pipeline within Quarry Creek from future intertie with Oceanside to 14 inch diameter pipeline in Tamarack Avenue.	IV	Unknown
56	--	Miscellaneous pipeline replacement projects. The project involves replacing sections of existing pipelines at currently unknown locations that are discovered to be failing because of corrosion, leakage at joints and valves, or damaged by contractors. It is projected that 2,000 LF feet could be replaced per year over the next 10 to 15 years.	IV	On-going

LF = linear feet

Source: CMWD 2012

Table 2-6 Proposed Water Storage Facility CIP Projects

CMWD ID No.	Zone	Description/Location	Phase	Projected Start Date
R1	700	Santa Fe II drainage system and crib wall repairs, consisting of removing the second tier crib wall structure and paving on top of the first tier crib wall from the crib wall face to the concrete tank wall. Also, install separate inlet/outlet pipe with tank mixer to resolve chlorine disinfection problems, repair the security fence and add signage, and install a new floor drain with mud valve.	I	2012
R2	--	New exterior/interior coating and miscellaneous appurtenance repairs/replacement at Elm, Skyline, La Costa Lo, Ellery and D3 Tanks. See Table 2-7.	II	2013
R3	--	Replace the floating cover for Maerkle Reservoir by unbolting the stainless steel strap at perimeter, removing the old polypropylene cover, and replacing with a new polypropylene cover, re-attaching stainless steel strap, and replacing the cover dewatering pumps.	II	2021
R4	--	Miscellaneous concrete reservoir upgrades at multiple locations, which would include valve and pipe improvements, providing power, adding mixing systems, restoration of security fence, security system improvements, and repaving access roads.	II	On-going
R5	264	Remove or relocate the 1.5 MG "E" Tank from site.	II	2014
R7	490	Miscellaneous facility improvements at Maerkle Reservoir, including replacing joint sealant in 10 MG tank, and adding security lights and cameras along access road, gates and site.	III	On-going
R8	--	Replace outlet tower valves and piping at Lake Calavera and re-grade the reservoir bottom. All work for this project has been completed, except for maintaining a habitat mitigation site over a 5-year period, which is in progress.	III	On-going

MG = million gallons

Source: CMWD 2012

Table 2-7 Water CIP Project R2 Details

Improvement	Storage Tank				
	Elm	Skyline	La Costa Lo	Ellery	D3
Ladder modifications & new safety climb equipment	X	X	X	X	X
New roof hatch and manway	X	X	X	X	
Tamper-proof lock assemblies	X	X	X	X	
New exterior coating	X	X	X	X	
New roof handrail	X	X	X	X	
New level gauge	X	X	X	X	
Install one new aluminum vent	X	X	X	X	
Caulking around tank perimeter wall at ring wall interface	X	X	X	X	X
Spot repairs on interior coating	X	X	X	X	X
New interior coating	X	X	X	X	X
Roof hatch repairs for six hatches					X
Screen replacements	X	X	X	X	X
New entry gate					X
Cathodic protection Improvements					X
New cover on chlorine detection vault					X

Source: CMWD 2012

Table 2-8 Proposed Water Pump Station CIP Projects

CMWD ID No.	Zone	Description/Location	Phase	Projected Start Date
F14	680	Construct an emergency pump station at Obelisco Place/Circle to provide fire flow at 20 psi. The pump station would be an above-ground precast concrete building (20-feet by 30-feet) and would include two pumps (1 operating and 1 standby) with a capacity of 2,000 gpm each with 40 hp motors. A 150 kW standby power generator would also be installed.	III, IV	2015
PS1	580	Install 240 kW standby generator in a new building (24 feet by 20 feet), a hydropneumatic tank, and a 100 gpm jockey pump at Calavera pump station.	I	2013
PS2	446	Abandon and remove Ellery pump station, which consists of four vertical turbine pumps mounted in suction barrels. Construct facilities to accommodate a portable pump station, which would consist of two 12 inch diameter steel riser pipes with isolation valves, and a portable pump, mounted to a trailer approximately 16 feet long by 8 feet wide by 8 feet high.	II	2014
PS3	330	Abandon and remove Buena Vista pump station and a 10,000 gallon forebay tank, which is 9 feet in diameter and 10 feet high. The two pumps are mounted in parallel at ground surface with 12 inch diameter suction and discharge pipes connecting to pump station and distribution pipe.	II	2013
PS4	490	Increase capacity of the Maerkle pump station from 10,500 gpm to 15,173 gpm to supply the CMWD's average day demand from the reservoir by adding an additional pump.	IV	2015

kW = kilowatt, gpm = gallons per minute, hp = horsepower

Source: CMWD 2012

Table 2-9 Proposed Groundwater CIP Projects

CMWD ID No.	Description/Location	Phase	Projected Start Date
51	Construct Rancho Carlsbad well water supply facilities consisting of one well with 10 inch diameter casing, 120 feet deep, and a 100 gpm vertical turbine pump with an 8 inch diameter pipeline extending from the well to CMWD's distribution pipe in El Camino Real.	IV	2018
52	Construct new facilities to produce, treat, and deliver groundwater to CMWD from the Mission Basin of the San Luis Rey River. Project includes one 10 inch diameter well casing that would extend 140 feet deep, a 2,000 gpm vertical turbine pump, a 3 mgd reverse osmosis treatment plant for total dissolved solids reduction, an 8 inch diameter brine discharge pipeline to an Oceanside sewer, and 16,640 feet of 16 inch diameter transmission pipe in El Camino Real to reach CMWD's distribution system designed to convey 2.26 mgd. The wells and reverse osmosis system would be installed on CMWD property that has been previously graded and used for two prior wells and a pump station/steel tank, located on the southeast corner of Mission Avenue and Foussat Road.	IV	2021

gpm = gallons per minute, mgd = million gallons per day

Source: CMWD 2012

Table 2-10 Proposed Miscellaneous Water CIP Projects

CMWD ID No.	Zone	Description/Location	Phase	Projected Start Date
39	241	Install new a PRS or pipeline to reduce pressures in Kelly Ranch Village "E." The 12 inch diameter pipeline would extend 1,200 LF and would be located in public streets. The PRS would be a standard below ground PRS.	IV	2016
44	--	Assess and repair or upgrade five PRSs.	III, IV	On-going
34	255	Replace valves, pipe, and meter for the Oceanside Intertie at ECR/SH78.	II	2015
45	--	Construct 4 new interties with adjacent water agencies for emergency supply. The project would consist of 12 inch diameter pipelines in public streets with a normally closed valve and meter in a below grade concrete vault connecting to adjacent agency distribution pipeline.	III, IV	On-going
46	--	Install hydroelectric turbines in a vault at #1 PRS connection.	IV	2013
R6	490	Construct a new hydroelectric PRS at Maerkle Reservoir, consisting of a 150 kW reverse turbine pump driven generator with switchgear, placed in an above grade precast concrete building (18-feet by 18-feet). Below grade electrical cables would be connected to on-site SDG&E power.	III	2013
38	--	Design and construct pipeline corrosion control improvements at multiple locations.	II, III, IV	On-going
41	--	Repair/replace broken valves at various locations.	II, III, IV	On-going

PRS = pressure regulating station, kW = kilowatt, LF = linear feet

Source: CMWD 2012

2.5.2.3 Water Master Plan Phasing

The CIP developed for the CMWD's water system are prioritized by capacity, reliability, or rehabilitation improvements to the existing system. Phase I represents projects that are underway or expected to be completed in 2012 through 2015. Phase II (2016-2020) represents high priority projects that should be planned or constructed over the following five years. Lower priority projects are identified as Phase III and Phase IV projects that would be phased over the following ten years (2020-2035).

2.5.3 Recycled Water Master Plan

2.5.3.1 Purpose

CMWD must contend with a multitude of challenges when providing a reliable water supply, including drought, legal and environmental constraints, climate change, and population growth. Recycled water provides a reliable, drought-resistant supply and the CMWD has been providing recycled water to the city since 1991. The Recycled Water Master Plan Update guides the continued development of the CMWD recycled water system.

Recycled water is supplied to the CMWD from three sources and is distributed through a separate recycled water distribution system to developed areas within the CMWD service area. In 2010, recycled water was delivered to over 370 irrigation sites including golf courses, parks, median strips, common area landscaping in residential and commercial developments, and other landscaped areas. CMWD receives recycled water from MWRf, owned and operated by the VWD, the CWRf, owned by CMWD but operated by the EWA, and the Gafner Water Reclamation Plant, owned and operated by the Leucadia Wastewater District. The ownership and capacity allocations from these three sources are summarized in Table 2-11.

Table 2-11 Recycled Water Supplies

Reclamation Plant Name	Owner	CMWD Allocation		Total Supply Capacity	
		mgd	afy	mgd	afy
Carlsbad Water Recycling Facility	CMWD	4	4,480	4	4,480
Meadowlark Water Reclamation Facility ⁽¹⁾	VWD	3	3,360	5	5,600
Gafner Water Reclamation Plant	LWWD	0.75	840	0.75	840
Total (Peak)		7.75	8,680	9.75	10,920

VWD = Vallecitos Water District; LWWD = Leucadia Wastewater District

mgd = million gallons per day; afy = acre feet per year

⁽¹⁾ By an August 2003 agreement with VWD, CMWD is limited to a maximum supply of 3 mgd from the MWRf out of 5 mgd supply capacity

Source: Carollo 2011

In 2010, 3.1 mgd (3,517 afy) of recycled water was delivered, which represents approximately 16 percent of the total water use in CMWD's service area. Recycled water deliveries are projected to be 8.1 mgd (9,106 afy) by 2020, including demands from neighboring jurisdictions. Total demand within the CMWD is projected to be 6.4 mgd (7,144 afy). Recycled water use will increase as the distribution system is expanded into future development areas and from conversion of existing potable water customers inside and outside the CMWD service area to the recycled water system. If all potential demands within CMWD are connected, CMWD would be expected to meet a recycled water use goal of approximately 27 percent of total water use by 2020. Future demand would potentially exceed the CMWD's recycled water allocation; therefore, new supply sources would be required to expand the recycled water system.

2.5.3.2 Capital Improvement Program Overview

The proposed CIP includes projects for the extension of recycled water facilities, replacement of existing pipelines, improvements to existing storage facilities, and increasing the capacity of the CWRP. These projects are discussed below. The majority of the future expansion segments would be installed in existing roads or concurrently with new development in future roadways.

System Expansion Segments

The Recycled Water Master Plan identifies expansion segments that were developed to maximize the number of customers that could be connected to the recycled water distribution system. Each of the segments is described briefly below and the proposed expansion CIP projects are listed in Table 2-12.

Expansion Segment 1

Expansion Segment 1 consists of 4,410 feet of 4 inch pipeline (CIP P01), 4,930 feet of 6 inch pipeline (CIP P02), 6,350 feet of 8 inch pipeline (CIP P03), and 58 service laterals (CIP P04) with an ultimate system demand of 123 afy. Expansion Segment 1 is located in the center of CMWD's service area and consists of connecting customers in the business park surrounding Palomar Airport Road.

Expansion Segment 2

Expansion Segment 2 consists of 3,900 feet of 8 inch pipeline (CIP P06), 3,900 feet of 12 inch pipeline (CIP P07), 200 feet of 16 inch pipeline (CIP P08), 8,400 feet of 18 inch pipeline (CIP P09), and 18 service laterals (CIP P11) with an ultimate system demand of 782 afy. This segment would extend the recycled water system north from CWRP along Avenida Encinas to the new power plant and across the lagoon.

Expansion Segment 3

Expansion Segment 3 consists of 1,600 feet of 6 inch pipeline (CIP P12), and 1,400 feet of 8 inch pipeline (CIP P13) to serve three customers (CIP P15) with an ultimate system demand of 14 afy. Expansion Segment 3 would connect several potential developments and existing home owner association (HOA) customers along College Boulevard and El Camino Real, providing redundancy to the Calavera pump station and Zone 384.

Expansion Segment 4 (VID and Oceanside)

Expansion Segment 4 is intended to evaluate the potential of serving demands within VID and the southeast portion of Oceanside. Three expansion segments were developed for Expansion Segment 4:

- Expansion Segment 4A – Wholesale Service to VID at Shadowridge Water Reclamation Plant (CIP P16, CIP P17, and CIP P18)
- Expansion Segment 4B – Retail Service to VID and southeast Oceanside customers north of Shadowridge Water Reclamation Plant (CIP P19 through CIP P24)
- Expansion Segment 4C – Retail Service to all identified customers within VID south of Shadowridge Water Reclamation Plant (CIP P25 through CIP P29)

The ultimate system demand of the three expansion 4 segments totals 1,360 afy.

Expansion Segment 5

Expansion Segment 5 consists of 6,200 feet of 4 inch pipeline (CIP P30), 6,700 feet of 6 inch pipeline (CIP P31), 25,780 feet of 8 inch pipeline (CIP P32), and 21 service laterals (CIP P34) with an ultimate system demand of 454 afy. This segment would extend the recycled water distribution system north along El Camino Real to serve the second phase of Robertson's Ranch, several existing HOAs, and existing landscape irrigation.

Expansion Segment 6

Expansion Segment 6 consists of 1,800 feet of 6 inch pipeline (CIP P35) to serve two customers (CIP P37) with an ultimate system demand of 18 afy. The La Costa Ridge HOA is currently served recycled water by a private pump station and existing pipeline near MWRP. It is anticipated that CMWD will take over operation of the pump station and pipeline. Expansion Segment 6 would build upon this existing pipeline, extending it to serve three additional customers near the La Costa Ridge HOA.

Expansion Segment 7

Expansion Segment 7 (CIP P38) consists of 800 feet of 4 inch pipeline, 5,100 feet of 6 inch pipeline, 1,750 feet of 8 inch pipeline, and 11 service laterals with an ultimate system demand of 97 afy. Expansion Segment 7 would provide service to the Quarry Creek development. Based on an estimated elevation of 117 feet AMSL, a pressure regulator may be required. Based on input from CMWD staff, it is anticipated that the alignment along Tamarack Avenue and down the hillside, crossing approximately 300 feet of HOA property outside the public right of way, is preferable to another possible alignment along Milford Place or College Boulevard and Marron Road, portions of which would extend outside CMWD's service area.

Expansion Segment 8 (OMWD and La Costa Resort and Spa)

Expansion Segment 8 consists of 1,300 feet of 6 inch pipeline (CIP P39) and 6,500 feet of 12 inch pipeline (CIP P40) to serve La Costa Resort and Spa and OMWD's demands lower zone demand with an ultimate system demand of 520 afy. Expansion Segment 8 would consist of a pipeline along El Camino Real, connecting CMWD's recycled water system to OMWD and existing landscape irrigation at La Costa Resort and Spa. The feasibility of developing this alternative depends greatly on the timing of recycled water needs from OMWD. This alignment could also be used to connect CMWD's currently isolated Gafner Water Reclamation Plant distribution system to CMWD's extensive recycled water distribution system, assuming appropriately sized pumps would be installed at Gafner Water Reclamation Plant.

Expansion Segment 9

Expansion Segment 9 consists of 1,600 feet of 6 inch pipeline (CIP P41) and 4,200 feet of 8 inch pipeline (CIP P42) to serve six customers (CIP P43) with an ultimate system demand of 91 afy. This segment would expand the recycled water system south to the San Pacifico HOA and various existing landscape irrigation and potential development. A portion of this alignment would extend south along Avenida Encinas to the Poinsettia Village shopping center and the Lake Shore Garden mobile home park.

Expansion Segment 10 (VWD)

Expansion Segment 10 consists of 6,000 feet of 8 inch pipeline (CIP P44), and 18 service laterals (CIP P45) with an ultimate system demand of 82 afy. This segment would serve the commercial development in VWD service area near MWRP. It is anticipated that the south leg of this alignment could be connected directly to VWD's pipeline (upstream from CMWD's meter).

Expansion Segment 11

Expansion Segment 11 consists of 2,700 feet of 4 inch pipeline (CIP P46), 7,500 feet of 6 inch pipeline (CIP P47), 10,400 feet of 8 inch pipeline (CIP P48), and 5,100 feet of 12 inch pipeline (CIP P49) to serve 29 customers (CIP P50) with an ultimate system demand of 120 afy. This segment would extend Expansion Segment 2 north to the Carlsbad Village, serving existing parks, schools, and landscape irrigation demands in the Carlsbad Village area. The proposed alignment crosses Interstate 5 at Chestnut Avenue, extending north along the freeway to Holiday Park, the civic center, and Buena Vista school. This expansion segment would require either Expansion Segment 2 or Expansion Segments 5 and 12 (with the loop connection along Chestnut Avenue).

Expansion Segment 12

Expansion Segment 12 consists of 500 feet of 4 inch pipeline (CIP P51), 2,500 feet of 6 inch pipeline (CIP P52), and 5,100 feet of 8 inch pipeline (CIP P53) to serve four customers (representing 14 meters (CIP P54)) with an ultimate system demand of 41 afy. Expansion Segment 12 would extend Expansion Segment 11 north from Carlsbad Village to several schools. This alignment is dependent on Expansion Segment 2 and Expansion Segment 11 or Expansion Segment 5 with the loop connection along Chestnut Avenue.

Expansion Segment 13

Expansion Segment 13 consists of 2,600 feet of 8 inch pipeline (CIP P55) to serve six service laterals (CIP P56) with an ultimate system demand of 20 afy. This segment would serve customers along Paseo Del Norte and Car Country Drive, connecting the pipelines along Cannon Road and Palomar Airport Road.

Expansion Segment 14

Expansion Segment 14 consists of 500 feet of 4 inch pipeline (CIP P57), 4,000 feet of 8 inch pipeline (CIP P59) to serve four service laterals (CIP P60) with an ultimate system demand of 85 afy. This segment would connect the Carlsbad Canterbury HOA and Rancho Carlsbad Executive Golf Course to the existing recycled water distribution system, connecting some existing recycled water pipeline segments currently conveying potable water along Jackspar Drive and Frost Avenue. After development of Expansion Segment 3, this Expansion Segment would connect the pipeline in Cannon Road with the pipeline in College Boulevard. The Rancho Carlsbad Golf Course could be served from Expansion Segment 3; it is anticipated that the golf course would be connected from Jackspar Drive rather than along El Camino Real.

Expansion Segment 15

Expansion Segment 15 consists of 1,000 feet of 4 inch pipeline (CIP P61) and 1,300 feet of 8 inch pipeline (CIP P62) to serve a total of nine meters (CIP P63) for four HOAs with an ultimate system demand of 22 afy. This segment would connect the Viaggio HOA, Aviara Masters HOA, and Marea to the existing recycled water distribution system. A second leg of this alignment would connect the Tramonto HOA to the existing recycled water distribution system and could connect to a potential HOA development south of Hummingbird Road.

Expansion Segment 16

Expansion Segment 16 consists of 1,400 feet of 6 inch pipeline (CIP P64) to serve three meters (CIP P65) for the Pavoreal HOA with an ultimate system demand of 10 afy. This segment would connect the Pavoreal HOA to the existing recycled water distribution system.

Expansion Segment 17

Expansion Segment 17 consists of 1,800 feet of 4 inch pipeline (CIP P66), 13,200 feet of 6 inch pipeline (CIP P67), 4,000 feet of 8 inch pipeline (CIP P68), and 26 service laterals (CIP P69) with an ultimate system demand of 85 afy. This segment would connect the HOAs north of La Costa Resort (Greenview HOA, Alga Hills HOA, Jockey Club HOA, Alicante Hills HOA, and Fairways HOA) to the existing recycled water system.

Expansion Segment 18

Expansion Segment 18 consists of 1,700 feet of 6 inch (CIP P70), 6,500 feet of 8 inch pipelines (CIP P71) to serve 12 existing meters with an ultimate system demand of 24 afy. This segment would connect several existing commercial irrigation demands north of Faraday Avenue to the existing recycled water distribution system.

Other System Expansion Projects

In addition to the 18 expansion segments developed to connect potential customers, two expansion segments were developed for other reasons, including looping, connection to storage, and increasing redundancy in the system (CIP P74 and CIP P78). These projects are described below. Additionally, a total of 47 new meters would be installed to retrofit customers near the existing recycled water system (CIP P73) and to add new customers to the existing system (CIP P75).

Redundancy Pipeline for Carlsbad Village (CIP P74)

This pipeline would connect Expansion Segment 12 and Expansion Segment 5 to provide a second supply of recycled water to the Carlsbad Village. This pipeline would consist of 4,200 feet of pipeline. Since Expansion Segments 5 and 12 are both a part of the same zone, no pressure regulating or booster pumping stations are anticipated to be required. This pipeline would also serve as an alternate way to connect Expansion Segment 12 if Expansion Segment 11 or 2 are not constructed.

Pipeline to Santa Fe I (CIP P78)

The Santa Fe I tank is a 2.5 MG abandoned potable reservoir at an elevation suitable as gravity storage. While the tank is connected to an abandoned pipeline along Palomar Airport Road, portions of the pipeline have been destroyed. An alternate alignment over a shorter distance of 4,200 feet from the north would connect the tank to pipelines proposed as a part of Expansion Segment 4C. The rehabilitated Santa Fe I tank could then provide gravity storage for existing CMWD customers as well as customers connected by Expansion Segment 4C.

Table 2-12 Proposed Recycled Water Expansion Projects

Project ID	Pipe Size (diameter in inches)	Length (linear feet)	Planning Phase	Projected Start Date
Expansion Segment 1: Streets adjacent to Camino Vida Roble and Business Park along Palomar Oaks Way				
P01	4	4,410	Build-out	2015
P02	6	4,930	Build-out	2015
P03	8	6,350	Build-out	2015
P04	Related Improvements:	Install 58 meters	Build-out	2015
	Total Pipeline:	15,690		
Expansion Segment 2: Carlsbad Blvd and Cannon Road				
P06	8	3,900	Phase III	2015
P07	12	3,900	Phase III	2015
P08	16	200	Phase III	2015
P09	20	8,400	Phase III	2015
P11	Related Improvements:	Install 18 meters	Phase III	2015
	Total Pipeline:	16,400		
Expansion Segment 3: Camino Hills HOA				
P12	6	1,600	Phase III	2022
P13	8	1,400	Phase III	2022
P15	Related Improvements:	Install 3 meters	Phase III	2022
	Total Pipeline:	3,000		
Expansion Segment 4A: Shadowridge				
P17	12	700	Phase III	2015
P16	Related Improvements:	Install 2 interconnections	Phase III	2015
P18		Install 1 meter	Phase III	2015
Expansion Segment 4B: VID and Oceanside				
P19	4	500	Phase III	2022
P20	6	4,000	Phase III	2022
P21	8	5,400	Phase III	2022
P22	12	11,700	Phase III	2022
P23	16	1,600	Phase III	2022
P24	Related Improvements:	Install 9 meters	Phase III	2022
	Total Pipeline:	23,200		
Expansion Segment 4C: VID Business Park				
P25	4	2,600	Build-out	2022
P26	6	22,600	Build-out	2022
P27	8	11,400	Build-out	2022
P28	12	27,200	Build-out	2022
P29	Related Improvements:	Install 369 meters	Build-out	2022
	Total Pipeline:	63,800		
Expansion Segment 5A: HOA along Tamarack and El Camino Country Club				
P30	4	6,200	Build-out	2014
P31	6	6,700	Build-out	2014
P32	8	25,780	Build-out	2014
P34	Related Improvements:	Install 21 meters	Build-out	2014
	Total Pipeline:	38,680		

Table 2-12 Proposed Recycled Water Expansion Projects (continued)

Project ID	Pipe Size (diameter in inches)	Length (linear feet)	Planning Phase	Projected Start Date
Expansion Segment 6				
P35	6	1,800	Build-out	2022
P37	Related Improvements:	2 meters	Build-out	2022
Expansion Segment 7: Quarry Creek				
P38	4	800	Phase III	2014
	6	5,100	Phase III	2014
	8	1,750	Phase III	2014
	Related Improvements:	Install 11 meters	Phase III	2014
	<i>Total Pipeline:</i>	7,650		
Expansion Segment 8: La Costa Resort and OMWD				
P39	6	1,300	Phase III	2014
	12	6,500	Phase III	2014
P40	Related Improvements:	Install 1 meter	Phase III	2014
	<i>Total Pipeline:</i>	7,800		
Expansion Segment 9: Ponto Area				
P41	6	1,600	Phase III	2014
P42	8	4,200	Phase III	2014
P43	Related Improvements:	Install 6 meters	Phase III	2014
	<i>Total Pipeline:</i>	5,800		
Expansion Segment 10: Melrose Business Park				
P44	8	6,000	Phase III	2020
P45	Related Improvements:	Install 18 meters	Phase III	2020
Expansion Segment 11: Old Carlsbad along Carlsbad Blvd				
P46	4	2,700	Build-out	2022
P47	6	7,500	Build-out	2022
P48	8	10,400	Build-out	2022
P49	12	5,100	Build-out	2022
P50	Related Improvements:	Install 29 meters	Build-out	2022
	<i>Total Pipeline:</i>	25,700		
Expansion Segment 12: Carlsbad Schools				
P51	4	500	Build-out	2022
P52	6	2,500	Build-out	2022
P53	8	5,100	Build-out	2022
P54	Related Improvements:	Install 14 meters	Build-out	2022
	<i>Total Pipeline:</i>	8,100		
Expansion Segment 13: Paseo Del Norte, Car County				
P55	8	2,600	Build-out	2022
P56	Related Improvements:	Install 6 meters	Build-out	2022
Expansion Segment 14: Frost Ave				
P57	4	500	Phase III	2022
P59	8	4,000	Phase III	2022
P60	Related Improvements:	Install 4 meters	Phase III	2022
	<i>Total Pipeline:</i>	4,500		

Table 2-12 Proposed Recycled Water Expansion Projects (continued)

Project ID	Pipe Size (diameter in inches)	Length (linear feet)	Planning Phase	Projected Start Date
Expansion Segment 15: HOAs south of Aviara				
P61	4	1,000	Phase III	2022
P62	6	1,300	Phase III	2022
P63	Related Improvements:	9 meters	Phase III	2022
	<i>Total Pipeline:</i>	2,300		
Expansion Segment 16: Pavoreal HOA				
P64	6	1,400	Build-out	2022
P65	Related Improvements:	Install 3 meters	Build-out	2022
Expansion Segment 17: HOAs south of La Costa				
P66	4	1,800	Build-out	2022
P67	6	13,200	Build-out	2022
P68	8	4,000	Build-out	2022
P69	Related Improvements:	Install 26 meters	Build-out	2022
	<i>Total Pipeline:</i>	19,000		
Expansion Segment 18: Impala/Portion of Palmer				
P70	6	1,700	Build-out	2022
P71	8	6,500	Build-out	2014
	<i>Total Pipeline:</i>	8,200		
Other System Expansion Pipelines				
P73	Retrofit Customers near Existing System	Install 30 meters	Phase III	2014
P74	Redundancy Looping	Install 4,200 feet of 12 inch diameter pipeline	Build-out	2014
P75	Customers Near Existing System	Install 17 meters	Phase III	2014
P78	Pipeline to Santa Fe Tank I	Install 3,600 feet of 12 inch diameter pipeline	Build-out	2022
	Total Pipeline Extensions/ Replacements:	270,120		

Source: CMWD 2012

Other Recycled Water Demands

In addition to the potential customers that would be served with the expansion segments discussed above, there are additional demands anticipated that are associated with future developments. New recycled water pipelines would be required to connect irrigation meters to the existing system. Extending pipeline to these developments were not included in the expansion segments due to the indefinite timing of these developments. The demands and pipelines associated with serving these developments were included in the hydraulic model in order to adequately size the system for build-out demand conditions. However, pipeline alignments are preliminary and it is anticipated that more detailed routing and sizing of these pipelines would be developed as more details on the developments are made available. The total length of all future pipelines is anticipated to be approximately five miles total.

Recycled Water Storage Projects

CMWD recycled water storage consists of operations storage, which is required to buffer demand fluctuations under maximum day demand conditions, and short-term emergency storage, which is the storage volume required for preventing a reservoir from completely draining during an emergency situation. The Recycled Water Master Plan concludes that additional operational storage would be required once demands from service zones 550 and 660 exceed available supply from MWRF on a maximum day demand basis. The Recycled Water Master Plan recommends that the ultimate system include 2.5 MG of new storage capacity for Zone 550. This can be met by rehabilitating the 2.5 MG Santa Fe I tank in Pressure Zone 660. In addition, increased demand for supply from the CWRf may result in the need for an additional storage reservoir in the northern area of the system in Pressure Zone 384. The proposed recycled water storage projects are listed in Table 2-13.

In addition to storage capacity, the Recycled Water Master Plan includes an analysis of water quality in storage tanks. The Recycled Water Master Plan determined that under minimum daily demand (MinDD) conditions, chlorine residuals in the C Tank and Mahr Reservoir would be too low. The low MinDD creates a low turnover of water in each reservoir, thereby creating a low chlorine residual. CMWD would alleviate the low chlorine residuals under MinDD conditions by installing a chlorination and mixing system in the low residual reservoirs. CMWD completed installation of a chlorination and mixing system for Mahr Reservoir in 2008. Installation of a mixing and chlorination system at the C Tank is proposed in the CIP and included in Table 2-13.

Table 2-13 Proposed Recycled Water Storage CIP Projects

Project ID	Description/Location	Phase	Projected Start Date
P76	C Tank Chlorination and Mixing System	Existing	Existing
P77	Utilize Twin D Tank Site in Zone 384 to store an additional 2.0 MG. This could be accomplished by relocating the 1.5 MG "E" Tank that has been taken out of service in the water distribution system to the Twin D Tank site. The work would consist of constructing a concrete ring wall and moving the "E" Tank from its current site and then connecting it to the 18 inch diameter transmission main in Black Rail Road.	Build-out	2014
P79	Rehabilitate Santa Fe Tank I to store an additional 2.5 MG	Build-out	2022

MG = million gallons

Source: Carollo 2011

Recycled Water Supply Projects

To meet future demand, the Recycled Water Master Plan recommends the expansion of CWRP, abandoning the Gafner Water Reclamation Plant, and continued utilization of MWRF. The recommended supply strategy is to utilize MWRF as CMWD's baseline supply and CWRP as CMWD's peaking supply while incorporating seasonal storage as possible. Mahr Reservoir could be used as a source of supply in the maximum demand months. However, using seasonal storage to this degree would require very strict accounting and operations of the water in Mahr Reservoir in order to avoid running short on supplies in the maximum month. If demands peak higher in a year due to higher temperatures or low rainfall, supply shortfalls could ensue. Therefore, CWRP is proposed to be expanded by a total of 7 mgd to meet the entire anticipated future demand, and Mahr Reservoir would only be used as seasonal and emergency storage backup supply. The proposed supply projects are described below in Table 2-14.

Table 2-14 Proposed CWRP Recycled Water Supply CIP Projects

Project ID	Description/Location	Phase	Projected Start Date
P80	Increase capacity of CWRP by installing additional filtration units and chlorine contact basins an additional 4 mgd for a total capacity of 8 mgd to meet Phase III demand.	Phase III	2014
P81	Increase capacity of CWRP by installing additional filtration units and chlorine contact basins an additional 3 mgd for a total capacity of 11 mgd to meet build-out demand.	Build-out	2022

mgd = million gallons per day

Source: Carollo 2011

2.5.3.3 Recycled Water Master Plan Phasing

Implementation of the Recycled Water Master Plan is divided into three phases: Existing (Phase I and Phase II), Phase III, and Build-out. Phases I and II were previously implemented as part of the previous Master Plan program. It is anticipated that any improvements to the Existing phase facilities would be implemented at the same time as Phase III. The proposed recycled water system improvements are described by phase below.

Existing

This existing phase consists of the proposed CIP (CIP 76) to install a cover and automatic skimmer at the CWRP chlorine contact tank, and cover two 7.0 MG treated water emergency storage tanks. The covers would consist of either fabric or a metal shroud on top of the tanks. The automated skimmer would be installed at the downstream end of the chlorine contact tank. Water skimmed would be routed back to the secondary treatment clarifiers at the Encina Water Pollution Control Facility.

Phase III (2012-2020)

Phase III includes the most feasible alignments for expansion of the recycled water system. This would expand CMWD's recycled water system to the north area of Carlsbad and begin initial expansion into the neighboring agencies through wholesale service to VID for the Shadowridge Golf Course, OMWD for irrigation use at schools and common areas in the Village Park area of Encinitas, and Oceanside at the El Camino Country Club Golf Course.

Build-out Phase (2021-2035)

The Build-out Phase includes the expansion alignments not included in Phase III, as well as the backbone pipelines to the potential new developments with uncertain timing.

2.6 Construction Methods

The schedule for construction of the proposed CIP projects is varied, depending on the phasing for each Master Plan. The phasing for each of the proposed master plans is described above in the description of each plan. Specific construction schedules are not available for the project-level at this time. In general, construction would proceed in several phases, with the final phase being completed in the projected buildout year of 2035 for the Sewer Master Plan, Recycled Water Master Plan, and the Water Master Plan. It is noted that phasing for recommended improvement projects may be accelerated or deferred as required to account for changes in development schedules, availability of land or rights-of-way for construction, funding limitations, and other considerations that cannot be predicted at this time.

Equipment associated with the construction of the proposed CIP projects would utilize typical construction equipment including dozers, rollers, dewatering pumps, backhoes, loaders, delivery and haul trucks. Pipeline extension and replacement projects would utilize open trenching or jack-and-bore methods. Open trench pipeline construction would require trenches varying in width from 2 feet to 12 feet depending on the diameter of the pipe and its depth. Trenchless pipeline installation would occur for some major roadway crossings, such as Interstate 5, high traffic impact areas, railroad crossings, and across sensitive habitat areas. Trenchless sewer pipelines include Sewer Master Plan CIP I-4, CIP I-5, and CIP SR-14. Trenchless water pipelines include Water Master Plan CIP F15 to cross Interstate 5, and CIP 10 and CIP 48 where the pipelines cross sensitive habitat areas such as creek crossings and hardline habitat management zones unless mitigated. Trenchless recycled water pipeline projects include crossing Palomar Airport Road along Avenida Encinas and crossing San Marcos Creek in the La Costa South Golf Course. The construction of pipeline projects and other CIP projects within roadways may, as deemed necessary, require a temporary lane or roadway closure during construction activities. No grading would be required for proposed CIP projects that would occur on existing building pads, such as the improvements to the CWRP; however, grading would be required for the new pump stations and access road improvements. Construction of CIP pump stations, groundwater facilities, CWRP capacity improvements, and reservoir expansions would take approximately 18 months each to complete. Lift station demolitions would take approximately three months to complete. Minor improvements such as meter installations, manhole replacements, pump replacements, minor lift station improvements, and minor storage and reservoir rehabilitations would not require heavy construction equipment except for a crane to lift pumps and valves for removal and installation.

2.6.1 Regulatory Compliance

Construction and operation of the CIP projects proposed in the Sewer, Water, and Recycled Water Master Plans would be conducted in compliance with all applicable federal, state, and local laws and regulations, including a variety of environmental laws and regulations pertaining to various environmental topics, such as the following:

Air Quality

During construction activities for proposed CIP projects, the City and CMWD would comply with San Diego Air Pollution Control District Rule 55, Fugitive Dust Control. Rule 55 requires the following:

1. No person shall engage in construction or demolition activity in a manner that discharges visible dust emissions into the atmosphere beyond the property line for a period or periods aggregating more than 3 minutes in any 60 minute period; and
2. Visible roadway dust as a result of active operations, spillage from transport trucks, erosion, or track-out/carry-out shall be minimized by the use of effective trackout/carry-out and erosion control measures listed in Rule 55 that apply to the project or operation. These measures include track-out grates or gravel beds at each egress point; wheel-washing at each egress during muddy conditions; soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding; watering for dust control; and using secured tarps or cargo covering, watering, or treating of transported material for outbound transport trucks.

Biological Resources

Habitat Management Plan for Natural Communities in the City of Carlsbad

Prior to construction activities for CIP projects located within the boundaries of the city, and where it has been demonstrated through project-level studies that the CIP project could result in impacts to biological resources addressed in the Carlsbad Habitat Management Plan (HMP) for Natural Communities, including HMP Species, Narrow Endemic Species, HMP Habitats, Existing and Proposed HMP Hardline Preserve Areas, Special Resource Areas, and HMP Core and Linkage Areas, as defined in the HMP, the City and/or CMWD would demonstrate how implementation of the project would comply with the requirements of the HMP, including the established conservation goals and objectives of the HMP, and the avoidance, minimization, and mitigation measures identified for protected resources. The City would use its land-use regulatory authority to fully implement the provisions of the HMP during CIP project review, and would follow the project processing implementation procedures as required by Carlsbad Municipal Code Chapter 21.210, Habitat Preservation and Management Requirements.

U.S. Fish and Wildlife Service Consultation

Prior to construction activities for CIP projects located outside of areas subject to the Carlsbad HMP where it has been demonstrated through project-level studies that U.S. Fish and Wildlife Service (USFWS) critical habitat and/or a federally threatened or endangered species (i.e. federally listed species) could be affected by the project and, prior to construction activities for CIP projects located within areas subject to the Carlsbad HMP where it has been demonstrated through project-level studies that USFWS critical habitat and/or a federally listed species not covered by the Carlsbad HMP could be affected by the project, the City and/or CMWD would comply with Section 7 and/or Section 10 of the Federal Endangered Species Act (FESA), as administered by USFWS and described below:

- The City and/or CMWD will complete formal consultations with, and/or obtain permits from, the USFWS pursuant to Section 7 or 10 of the FESA. Formal consultation with the USFWS pursuant to Section 7 of the FESA would apply to CIP projects requiring federal funding or authorization. The special terms and conditions outlined in the Biological Opinion resulting from Section 7 consultations will be implemented by the City, CMWD, and/or other responsible parties according to the timing required in the Biological Opinion. In the absence of federal funding or

authorizations, the City and/or CMWD will apply for a Section 10(a)(1)(B) permit from the USFWS pursuant to Section 10 of the FESA. The City and/or CMWD will prepare a habitat conservation plan or low-effect habitat conservation plan for approval by the USFWS.

California Department of Fish and Game Consultation

Prior to construction activities for CIP projects located outside of areas subject to the Carlsbad HMP where it has been demonstrated through project-level studies that a California state threatened or endangered species (i.e. state listed species) could be affected by the project and, prior to construction activities for CIP projects located within areas subject to the Carlsbad HMP where it has been demonstrated through project-level studies that a state listed species not covered by the Carlsbad HMP could be affected by the project, the City and/or CMWD would comply with Section 2080.1 and/or Section 2081 of the California Endangered Species Act (CESA), as administered by the California Department of Fish and Game (CDFG) and described below:

- The City and/or CMWD will complete consultations with, and obtain approvals or permits from, the CDFG pursuant to Section 2081 or 2080.1 of the CESA. For CIP projects determined to potentially affect state and federally listed species and, requiring a Biological Opinion from the USFWS or the preparation of a habitat conservation plan for USFWS approval, the City and/or CMWD will consult with the CDFG to determine whether a 2080.1 Consistency Determination could be issued for the project. If a 2080.1 cannot be issued, the City and/or CMWD will apply for a Section 2081 Incidental Take Permit (ITP) from the CDFG. The avoidance, mitigation, and conservation measures resulting from the Section 2081 ITP will be implemented by the City, CMWD, and/or other responsible parties according to the timing required in the ITP.

Jurisdictional Wetland Delineations

Prior to construction activities for CIP projects where it has been demonstrated through project-level studies that wetland and/or other resources potentially subject to the regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or CDFG could be affected by the project, the City and/or CMWD would perform jurisdictional wetland delineation studies as described below:

- The City and/or CMWD will retain a qualified biologist to conduct jurisdictional wetland delineations and prepare jurisdictional delineation reports in accordance with the methodologies and current regulatory guidance recommended by the USACE, RWQCB, and CDFG. The results of wetland delineations would be verified by the USACE during or prior to obtaining regulatory permits.

Wetland Permitting

For CIP projects where it has been confirmed through jurisdictional wetland delineations that wetland and/or other resources potentially subject to the regulatory jurisdiction of the USACE, RWQCB, and/or CDFG would be impacted by the project, the City and/or CMWD would comply with Section 404 and Section 401 of the federal Clean Water Act (CWA), and Section 1600 et seq. of the CDFG code, and will obtain the required permits from the USACE, RWQCB, and CDFG prior to project construction, as specified below:

- An application for a Nationwide or Individual Permit, depending upon the extent of impacts, will be submitted by the City and/or CMWD to the USACE pursuant to Section 404 of the CWA. If required, the City and/or CMWD will obtain a Nationwide or Individual Permit from the USACE for any impacts, temporary and permanent, to any areas within the proposed project which are determined to qualify as waters of the U.S. subject to USACE jurisdiction.
- For any CIP project requiring a federal license or permit to construct or operate, which may result in any discharge into navigable waters, the City and/or CMWD shall apply for a CWA Section 401 Certification from the RWQCB, to confirm that the discharge would comply with applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA.
- A Notification of Lake or Streambed Alteration will be submitted by the City and/or CMWD to the CDFG pursuant to CDFG Code Section 1602. If required, a Streambed Alteration Agreement will be obtained from the CDFG for any impacts, temporary and permanent, to any areas within the proposed project which are determined to qualify as streambed and/or riparian subject to CDFG jurisdiction.

In accordance with permit requirements, the City and/or CMWD would compensate unavoidable impacts to jurisdictional wetlands, and associated habitat.

Coastal Development Permit

Prior to construction activities for CIP projects located within the Coastal Zone, the City and CMWD would obtain a Coastal Development Permit (CDP) prior to the issuance of any city permit or approval. During the CIP project design phase, the City and CMWD will conduct project reviews and consult with the California Coastal Commission for any projects located within an area of deferred certification. Projects will be evaluated to ensure compliance with project setback requirements and specific avoidance, minimization, and mitigation measures for coastal stream, riparian, and wetland Environmentally Sensitive Habitat Areas (ESHA), as determined through project-level studies. In accordance with CDP requirements and to the maximum extent feasible, the CMWD and City will avoid and setback from ESHA, and will compensate unavoidable impacts to ESHA, and associated habitat. Please refer to Section 4.3, Biological Resources, for additional details regarding ESHA requirements within the Coastal Zone.

Cultural Resources

During construction activities for CIP projects, the City and CMWD would comply with Public Resources Code Section 5097.98 and California State Health and Safety Code 7050.5, upon unintentional discovery or disturbance of human remains. California State Health and Safety Code Section 7050.5 dictates that no further disturbance will occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined by the County Coroner to be Native American, the Native American Heritage Commission (NAHC) will be notified within 24 hours, and the guidelines of the NAHC will be met in the treatment and disposition of the remains. A professional archaeologist with Native American burial experience will conduct a field investigation of the specific site and consult with the Most Likely Descendant (MLD), if any, identified by the NAHC. As necessary and appropriate, a professional archaeologist will be retained by the City and/or CMWD to provide technical assistance to the MLD, including but not limited to, the excavation and removal of the human remains.

Geology

At the time of CIP project design, the City and CMWD would implement the relevant requirements of the Uniform Building Code (UBC), the California Building Code (CBC), and the Standards and Specifications for Public Works Construction, as updated or amended, and California Department of Mines and Geology's Special Publications 117, "Guidelines for Evaluating and Mitigating Seismic Hazards in California." The CBC provides a minimum seismic standard for certain building designs. Chapter 23 of the CBC contains specific requirements for seismic safety. Chapter 29 of the CBC sets forth regulations pertaining to excavation, foundations, and retaining walls. Chapter 33 of the CBC contains specific requirements pertaining to site demolition, excavation, and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 70 of the CBC regulates grading activities, including drainage and erosion control. In addition, construction activities are subject to federal and state occupational safety standards for excavation, shoring, and trenching as specified in California Occupational Safety and Health Administration regulations (Title 8 of the California Code of Regulations [CCR]) and in Section A33 of the CBC. California Department of Mines and Geology's Special Publications 117, "Guidelines for Evaluating and Mitigating Seismic Hazards in California," provides guidance for the evaluation and mitigation of earthquake-related hazards for projects within designated zones of required investigations.

Hydrology and Water Quality

Construction activities for implementation of CIP projects proposed in the Master Plans would comply with the federal CWA, California's Porter-Cologne Water Quality Control Act, the implementing regulations of the State Water Resources Control Board (SWRCB) and RWQCB, and the National Pollutant Discharge Elimination System (NPDES) Program. In accordance with the CWA and the NPDES program, the SWRCB adopted the California General Permit for Discharge of Storm Water Associated with Construction Activity, Construction General Permit Order 2009-0009 DWQ (General Permit) and the RWQCB has issued an NPDES/Waste Discharge Requirement for Municipal Separate Storm Sewer Systems (MS4s) under Order No. R9-2007-0001, NPDES No. CAS0108758, Waste Discharge Requirements for Discharges of Urban Runoff from the MS4s Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority (MS4 permit). CIP projects not falling within the triggering coverage thresholds of the General Permit would be subject to compliance with the implementing ordinances of the county and cities bound by the MS4 permit to enforce storm water discharge controls required under the MS4 permit. For CIP projects covered under the General Permit (e.g., generally for projects resulting in ground disturbance of greater than one acre), the City and/or CMWD would submit a Notice of Intent to be covered under the terms and conditions of the General Permit, prepare a Storm Water Pollution Prevention Plan prescribing Best Management Practices (BMPs), monitoring, inspection, and recordkeeping requirements in accordance with the General Permit provisions, in order to control storm water discharge rates, reduce erosion, and reduce the occurrence of pollutants in surface water runoff. The implementing ordinances of the cities and county under the MS4 permit generally require that storm water control measures of a similar nature be undertaken to ensure their compliance under the permit. BMPs (e.g., berms, straw wattles, silt fencing, swales, and percolation basins) are storm water control measures intended to control the rate of discharge and to prevent pollutants from entering storm water runoff, and may include measures to minimize project disturbance, protect slopes, reduce erosion, and limit or prevent various pollutants from entering surface water runoff, such as the following:

- **Minimizing disturbed areas.** Clearing of land is limited to that which will be actively under construction in the near term, new land disturbance during the rainy season is minimized, and disturbance to sensitive areas or areas that would not be affected by construction is minimized.
- **Stabilizing disturbed areas.** Temporary stabilization of disturbed soils is provided whenever active construction is not occurring on a portion of the site, and permanent stabilization is provided by finish grading and permanent landscaping.
- **Protecting slopes and channels.** Outside of the approved grading plan area, disturbance of natural channels is avoided, slopes and crossings are stabilized, and runoff velocity caused by the project is managed to avoid erosion to slopes and channels.
- **Controlling the site perimeter.** Upstream runoff is diverted around or safely conveyed through the project and is kept free of excessive sediment and other constituents.
- **Controlling internal erosion.** Sediment-laden waters from disturbed, active areas within the site are detained (e.g., siltation basins).

Hazards and Hazardous Materials

Construction and operation of the CIP projects proposed in the Master Plans would be conducted in compliance with all applicable federal, state, and local laws and regulations governing the use, management, handling, storage, release reporting and response actions, transportation, treatment, and disposal of hazardous materials, hazardous substances, and hazardous waste. These laws include:

- U.S. Resource Conservation and Recovery Act (42 U.S.C. Section 6901 et seq.), which provides the ‘cradle to grave’ regulation of hazardous wastes; the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. Section 9601 et seq.), commonly known as the “superfund” law addressing remediation of contaminated sites.
- U.S. Emergency Planning and Community Right-to-Know Act (42 U.S.C. Section 11001 et seq.), which establishes reporting requirements for facilities storing hazardous materials and is designed to help local communities protect public health, safety, and the environment from chemical hazards.
- U.S. Hazardous Materials Transportation Act (49 U.S.C. Section 5101 et seq.), which governs hazardous materials transportation on U.S. roadways.
- California Hazardous Waste Control Law (Health and Safety Code Section 25100 et seq.) and Hazardous Substances Account Act (Health and Safety Code Sections 25300 et seq.).
- California Proposition 65, formally known as "The Safe Drinking Water and Toxic Enforcement Act of 1986" (Health and Safety Code, Chapter 6.6, Sections 25249.5 through 25249.13), requiring persons and entities doing business in California using specific listed chemicals known to the state to cause cancer or reproductive harm or birth defects to provide a clear and reasonable warning to individuals entering the site regarding the presence of such chemicals, and the implementing regulations for such laws.
- County of San Diego Consolidated Fire Code, which regulates the use, handling, and storage requirements for hazardous materials at fixed facilities.

During construction, these laws govern the manner in which hazardous materials may be transported, used, stored, and disposed of as well as the handling and disposal of demolition debris containing

hazardous waste. During operations, these laws govern the use, management, storage, and transportation of hazardous materials and the management, handling, storage, transportation and disposal of hazardous wastes.

2.6.2 Project Design Features

The City and CMWD have incorporated numerous project design features and construction measures into the project design that are included in an effort to reduce the potential for environmental effects. The CIP projects proposed in the Master Plans would incorporate the following project design features:

Aesthetics

The following measures would be implemented into the design and construction of CIP projects to minimize potential effects on aesthetics to neighborhoods surrounding the CIP projects:

- Demolition debris will be removed in a timely manner for off-site disposal.
- Tree and vegetation removal will be limited to those depicted on construction drawings.
- Construction lighting will be shielded or directed away from adjacent residences.
- All roadway features (signs, pavement delineation, roadway surfaces, etc) and structures within state and private rights-of-way will be protected, maintained in a temporary condition, or restored.
- Disturbed areas will be restored following construction consistent with original site conditions and surrounding vegetation. [If removed vegetation included invasive plant species, the restored area shall be revegetated with a mix of native, non-invasive plants that are compatible with the surrounding setting.](#) If necessary, a temporary irrigation system will be installed and maintained by CMWD or the City, or watering trucks will be used at a frequency to be determined by CMWD or the City to maintain successful plant growth. For proposed CIP pipeline projects that would require trenching or that would require the temporary removal of concrete or asphalt, the disturbed area will be repaved to be consistent with the existing material.
- Above-ground components such as pump stations will be designed with exterior fencing, paint, and vegetative screening to reduce aesthetic impacts in visually sensitive areas.

Air Quality

The following BMPs would be implemented to minimize fugitive dust emissions and other criteria pollutant emissions during construction of CIP projects:

- Water or dust control agents will be applied to active grading areas, unpaved surfaces, and dirt stockpiles as necessary to prevent or suppress particulate matter from becoming airborne. All soil to be stockpiled over 30 days will be protected with a secure tarp or tackifiers to prevent windblown dust.
- Covering/tarping will occur on all vehicles hauling dirt or spoils on public roadways unless additional moisture is added to prevent material blow-off during transport.
- Dirt and debris spilled onto paved surfaces at the project site and on the adjacent roadway will be swept or vacuumed and disposed of at the end of each workday to reduce resuspension of particulate matter caused by vehicle movement. During periods of soil export or import, when

there are more than six trips per hour, dirt removal from paved surfaces will be done at least twice daily.

- Disturbed areas will be revegetated as soon as work in the area is complete.
- Electrical power will be supplied from commercial power supply wherever feasible, to avoid or minimize the use of engine-driven generators.
- Air filters on construction equipment engines will be maintained in clean condition according to manufacturers' specifications.
- The construction contractor will comply with an approved traffic control plan to reduce non-project traffic congestion impacts. Methods to reduce construction interference with existing traffic and the prevention of truck queuing around local sensitive receptors will be incorporated into this plan.
- Staging areas for construction equipment will be located as far as practicable from residences.
- Trucks and equipment will not idle for more than 15 minutes when not in service.

Biological Resources

The BMPs identified in the Carlsbad HMP would be implemented during the construction and operation of CIP projects to minimize potential effects on biological resources:

- Use BMPs to prevent pollution generated by construction activities from entering surface and groundwater. BMPs will also ensure that non-stormwater discharges are not discharged into stormwater drainage systems. BMPs may include:
 - Regulatory measures such as erosion control ordinances and floodplain restrictions.
 - Structural measures such as detention or retention basins, filters, weirs, check dams, or drainage diversions.
 - Vegetative controls that reduce volume and accomplish pollutant removal by a combination of filtration, sedimentation, and biological uptake.
 - Maintenance of pump stations, sewer lines, and stormwater conveyance systems.
 - Cultural practices such as restrictions on pesticide and fertilizer applications, storage or disposal of toxic chemicals, or washing of vehicles or equipment in areas that can drain to the estuary.
 - Public education programs that educate residences about proper disposal of oil or chemicals and that provide opportunities (e.g. designated locations) for residents to properly dispose of contaminants.
- For clearing, grading, and other construction activities within the watershed, ensure that proper irrigation and stormwater runoff mitigation measures are employed to reduce sediment loads and to prevent contamination from pesticide, fertilizers, petroleum products, and other toxic substances.
- Restrict or limit recreational or other activities within 200 feet of important forage, breeding, and roosting areas.

- Require attenuation measures for activities that generate noise levels greater than 60 dBA if occurring within 200 feet of important breeding habitat during the nesting season.
- Restrict construction hours to daytime hours that do not require the use of construction lighting.

Cultural Resources

The following procedure for unintentional disturbance of cultural resources will be implemented to minimize impacts to previously unknown archaeological resources during construction of CIP projects:

- If subsurface cultural resources are encountered during CIP project construction, or if evidence of an archaeological site or other suspected cultural resources are encountered, all ground-disturbing activity will cease within 100 feet of the resource. A qualified archaeologist will be retained by the City or CMWD to assess the find, and to determine whether the resource requires further study. [The assessment shall include consultation with the NAHC or Native American Tribe.](#) Any previously undiscovered resources found during construction will be recorded on appropriate Department of Parks and Recreation (DPR) 523 forms and evaluated by a qualified archaeologist retained by the City or CMWD for significance under all applicable regulatory criteria. No further grading will occur in the area of the discovery until the City and CMWD approves the measures to protect the resources. Any archaeological artifacts recovered as a result of mitigation will be donated to a qualified scientific institution approved by the City or CMWD where they would be afforded long-term preservation to allow future scientific study.

Geology and Soils

The following measures will be implemented into the construction and operation of CIP projects to minimize potential risks from geologic and soil hazards:

- A site-specific geotechnical investigation will be completed during the engineering and design of each CIP project that would require excavation in previously undisturbed soil, which would determine the risk to the project associated with fault rupture, groundshaking, liquefaction, landslides, and expansive soils. The geotechnical investigations will describe site-specific conditions and make recommendations that will be incorporated into the construction specifications for the CIP project. Recommendations may include, but would not be limited to the following typical measures:
 - Over-excavate unsuitable materials and replace them with engineered fill.
 - Remove loose, unconsolidated soils and replace with properly compacted fill soils, or apply other design stabilization features.
 - For thicker deposits, implement an applicable compaction technique such as dynamic compaction or compaction piles.
 - Perform in-situ densification of soils or other alterations to the ground characteristics.
 - For landslides, implement applicable techniques such as stabilization; remedial grading and removal of landslide debris; or avoidance.

Hazards and Hazardous Materials

The following measures would be implemented into the construction and operation of CIP projects to minimize potential effects related to hazards and hazardous materials:

- Fire safety information will be disseminated to construction crews during regular safety meetings. Fire management techniques will be applied during project construction as deemed necessary by the lead agency and depending on-site vegetation and vegetation of surrounding areas.
- A brush management plan will be incorporated during project construction by the City, CMWD, or a contractor, as necessary. Construction within areas of dense foliage during dry conditions will be avoided, when feasible.
- In cases where avoidance is not feasible, necessary brush fire prevention and management practices will be incorporated. Specifics of the brush management program will be determined as site plans for the project are finalized.
- A site-specific hazardous materials record search for the locations and type of hazardous materials for the site will be done and, if required, a site assessment will be conducted during final design of individual CIP project components.
- In order to ensure that the project does not cause a significant hazard to the public or the environment through release of or transport of hazardous materials during construction and operation, the City or its contractors, and the CMWD, will implement the following project design features:
 - Pipelines of the project components would be constructed with polyvinyl chloride pipe, or other material, which is highly resistant to rupture.
 - Pump stations included as part of the project, and stations that will service the proposed project will be designed or constructed with safety features, including an emergency generator on site in case of electrical failure, and sufficient sewage detainment capacity in the event of generator and/or pump mechanism failure to allow time for repair and/or emergency conveyance of the sewage. Portable emergency generators may be used for pump stations that cannot be equipped with an on-site generator. Should emergency leaks or spills occur, the Sewer Prevention and Response Plan for both the City and the CMWD will be implemented.

Hydrology and Water Quality

The following measures would be implemented into the construction and operation of CIP projects to minimize potential effects to hydrology and water quality:

- A construction spill contingency plan will be prepared for new facilities in accordance with County Department of Environmental Health regulations and retained on site by the construction manager. If soil is contaminated by a spill, the soil will be properly removed and transported to a legal disposal site.
- If groundwater is encountered and dewatering is required, then the groundwater will be disposed of by pumping to the sanitary sewer system or discharging to the storm drain system according to the conditions of the appropriate discharge permit.

- The lead agencies will consider using pervious or semi-pervious surfaces where possible to reduce the increase in the velocity of peak flows.
- For all potential impacts to natural drainages (i.e., pre-development hydrology), BMPs on site will be used to fully mitigate for project-related contaminants in the surface flows prior to their discharge to streams.
- For all trenchless construction activities, the City or CMWD will implement the following methods recommended by the CDFG and USFWS to prevent water pollution:
 - Implementation of the following techniques to reduce potential for hydrofracture and inadvertent returns that could pollute nearby water:
 - Sufficient earth cover will be used to increase resistance to hydrofracture.
 - An adequately dense drilling fluid will be used to avoid travel of drilling fluid in porous sands.
 - The bore will be conducted in a manner that avoids collapse.
 - Borehole pressure will be maintained at levels low enough to avoid hydro fracture.
 - Reaming and pullback rates will be maintained at rates slow enough to avoid over-pressurization of the bore.
 - The surface above the vicinity of the drill head will be visually monitored for surface evidence of hydrofracture.
 - Drilling methods will be modified to suit site conditions such that hydrofracture does not occur.
 - Hydrofractures will be cleaned immediately after they occur. Necessary response equipment will be readily accessible and in good working order.
 - Hydrofracture reporting and cleanup information will be disseminated to construction crews during regular safety meetings. All field personnel will understand their responsibility for timely reporting of hydrofractures.

Noise

The following measures would be implemented into the construction and operation of CIP projects to minimize noise effect to surrounding neighborhoods:

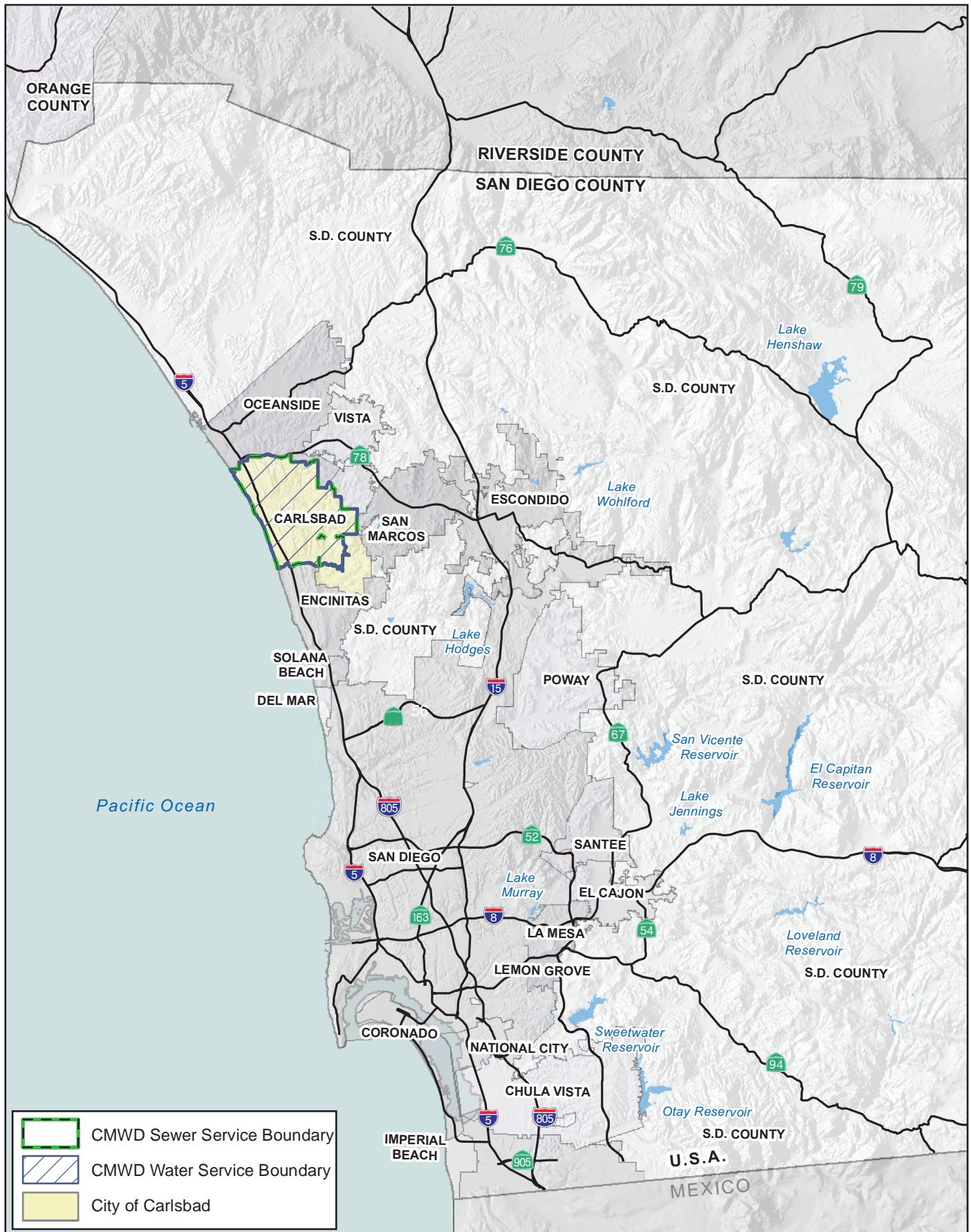
- Heavy equipment will be repaired at sites as far as practical from nearby residences.
- Construction equipment, including vehicles, generators and compressors, will be maintained in proper operating condition and will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, acoustical lagging, and/or engine enclosures).
- Construction work, including on-site equipment maintenance and repair, will be limited to the hours specified in the noise ordinance of the affected jurisdiction.
- Electrical power will be supplied from commercial power supply, wherever feasible, in order to avoid or minimize the use of engine-driven generators.
- Staging areas for construction equipment will be located as far as practicable from residences.

- Operating equipment will be designed to comply with all applicable local, state, and federal noise regulations.
- If lighted traffic control devices are to be located within 500 feet of residences, the devices will be powered by batteries, solar power, or similar sources, and not by an internal combustion engine.
- The City/CMWD or their construction contractors will provide advance notice, between two and four weeks prior to construction, by mail to all residents or property owners within 300 feet of the alignment. For projects that would require pile driving or blasting, noticing will be provided to all residents or property owners within 600 feet of the alignment. The announcement will state specifically where and when construction will occur in the area. If construction delays of more than 7 days occur, an additional notice will be made, either in person or by mail.
- The City/CMWD will identify and provide a public liaison person before and during construction to respond to concerns of neighboring residents about noise and other construction disturbance. The City/CMWD will also establish a program for receiving questions or complaints during construction and develop procedures for responding to callers. Procedures for reaching the public liaison officer via telephone or in person will be included in notices distributed to the public in accordance with the information above.
- For any construction activities which include blasting, a qualified blasting consultant and geotechnical consultant will prepare all required blasting plans and monitor all blasting activities in conformance with the Standards of the State of California, Department of Mines.

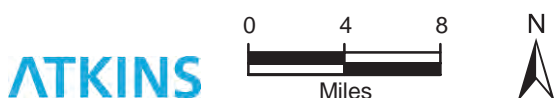
Transportation/Traffic

The following measures would be implemented during construction of CIP projects to minimize traffic effects to surrounding neighborhoods:

- Prior to construction, the City will prepare a traffic control plan and coordinate with the cities of Oceanside, Vista, and San Marcos to address traffic during construction of project components within the public right-of-ways of the affected jurisdiction(s), including bicycle, pedestrian, and transit facilities. The traffic control plan will include signage and flagmen when necessary to allow the heavy equipment to utilize residential streets. The traffic control plan will also include provisions for coordinating with local school hours and emergency service providers regarding construction times.



Source: ESRI, 2010; SanGIS, 2011

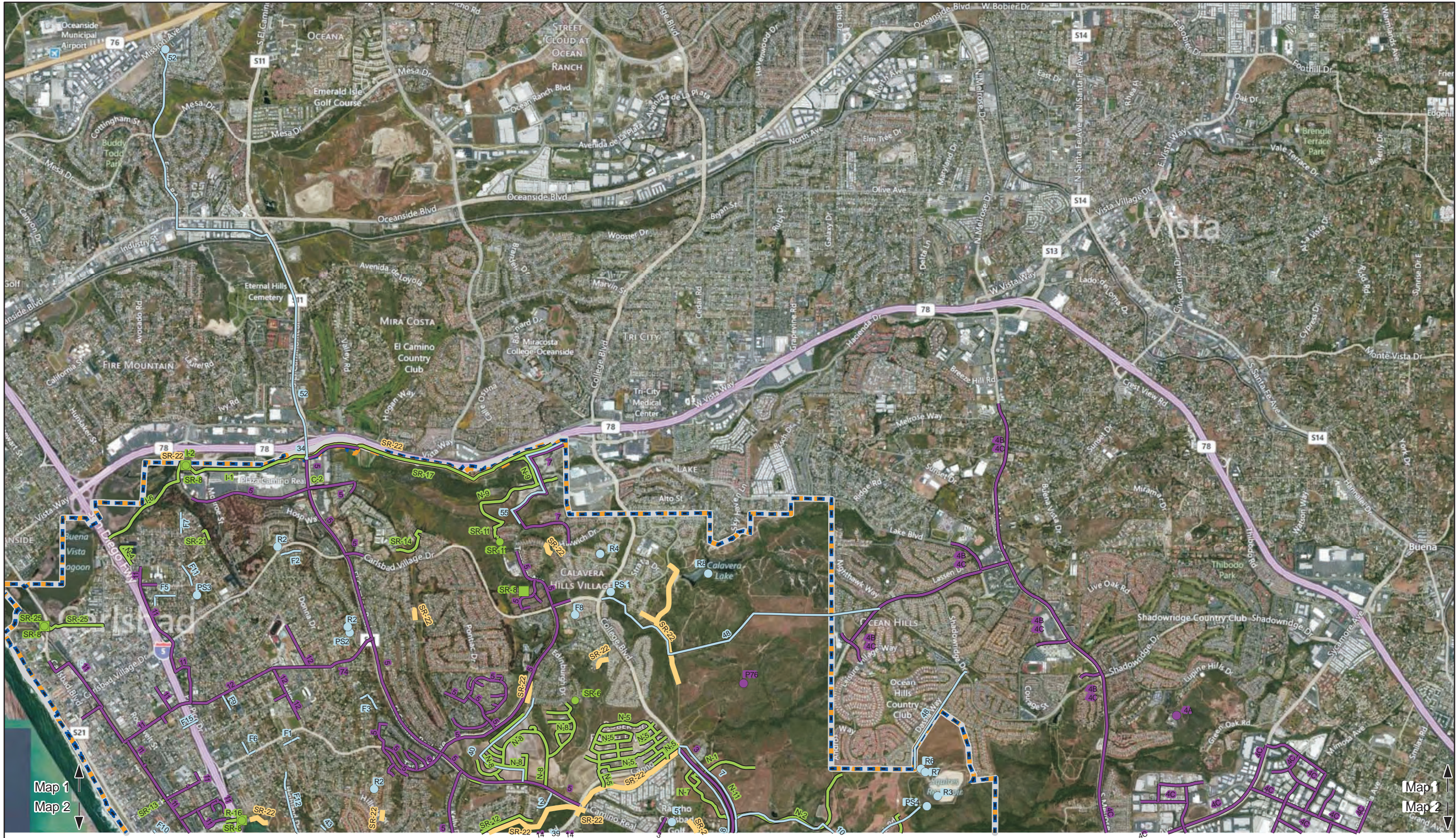


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REGIONAL LOCATION MAP FIGURE 2-1

CARLSBAD SEWER, WATER, AND RECYCLED WATER
MASTER PLANS EIR

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Aerial Source: Bing 2012

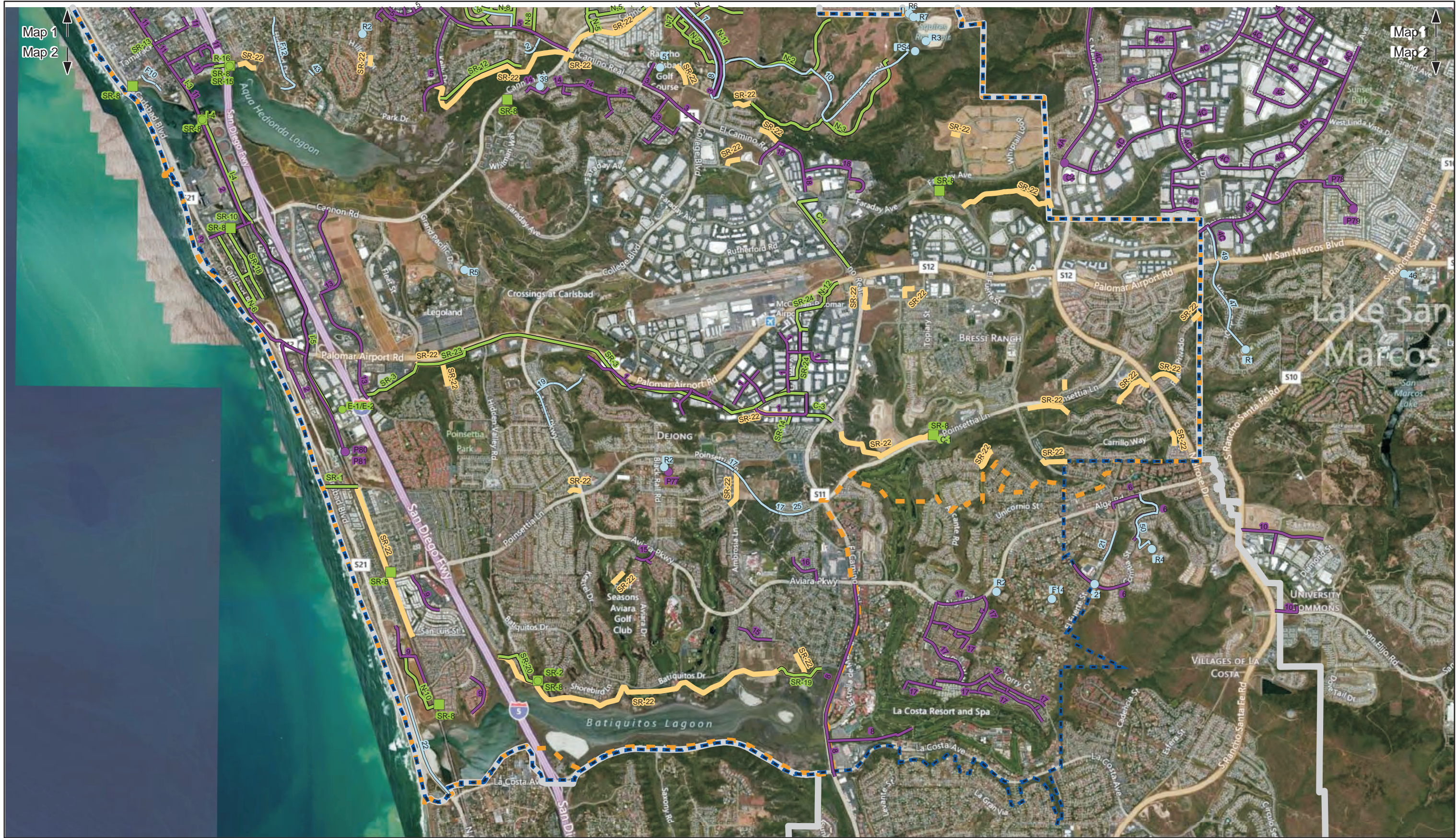
ATKINS

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|-----------------|-----------------------------------|------------------------|-----------------|-------------------|-------------------------|
| Water CIP Point | Recycled CIP Point | Sewer CIP Point | Sewer CIP Line | CMWD Boundary | Carlsbad Sewer District |
| Water CIP Line | Recycled Potential Expansion Line | Sewer R8 Lift Stations | Sewer Easements | Carlsbad Boundary | |

CIP PROJECTS LOCATIONS
(Map 1 of 2)
FIGURE 2-2



Aerial Source: Bing 2012



- | | | | | | |
|-----------------|-----------------------------------|------------------------|-----------------|-------------------|-------------------------|
| Water CIP Point | Recycled CIP Point | Sewer CIP Point | Sewer CIP Line | CMWD Boundary | Carlsbad Sewer District |
| Water CIP Line | Recycled Potential Expansion Line | Sewer R8 Lift Stations | Sewer Easements | Carlsbad Boundary | |

CIP PROJECTS LOCATIONS
(Map 2 of 2)
FIGURE 2-3